NATIONAL PETROLEUM RESERVE IN ALASKA

HISTORY
OF
DRILLING OPERATIONS

U. S. NAVY

SOUTH BARROW WELL NO. 14

HUSKY OIL NPR OPERATIONS, INC.
Prepared by: Drilling Department
Edited by: S. L. Hewitt and Gordon W. Legg

For the

U. S. GEOLOGICAL SURVEY
Office of the National Petroleum Reserve in Alaska
Department of the Interior
JANUARY 1983

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SOUTH BARROW WELL NO. 14

INTRODUCTION

The U. S. Navy South Barrow Well No. 14 is located in the East Barrow Gas Field in the National Petroleum Reserve in Alaska, formerly Naval Petroleum Reserve No. 4 (Figure 1). The designation "East Barrow Gas Field" is now applied to those wells which were earlier identified as "South Barrow Gas Field, East Area". The South Barrow Gas Field and the East Barrow Gas Field are now recognized as two separate fields. The well is located 2300' from the west line and 1800' from the north line of protracted Section 25, Township 22 North, Range 17 West, Umiat Meridian (Latitude: 71°13'58.79" North; Longitude: 156°18'11.02" West). The Alaska State Plane Coordinates are X = 699,955 and Y = 6,303,590, Zone 6. Elevations are 12' ground level, 17' drilling pad and 31' Kelly bushing. Drilling related operations started November 20, 1976, with mobilization of construction crews and equipment for the building of the drilling location. Rig-up operations began January 18, 1977, with the rig being moved from the South Barrow No. 13 location. Operations at South Barrow No. 14 ended on March 10, 1977.

The well was drilled to a total depth of 2,257 feet. The primary objectives of the well were the Barrow Gas sand and the Sag River Sandstone. At the conclusion of the drilling and evaluation operations, the well was killed with calcium-chloride water and a retrievable bridge plug set above the productive interval. The well was suspended as a productive natural gas well. A kill string was installed in the hole when the well was suspended.

Husky Oil NPR Operations, Inc. supervised and directed the drilling and completion operations as prime contractor for the Navy. Parco, Inc. was the labor contractor. The rig used was the Navy's Cardwell Model H.

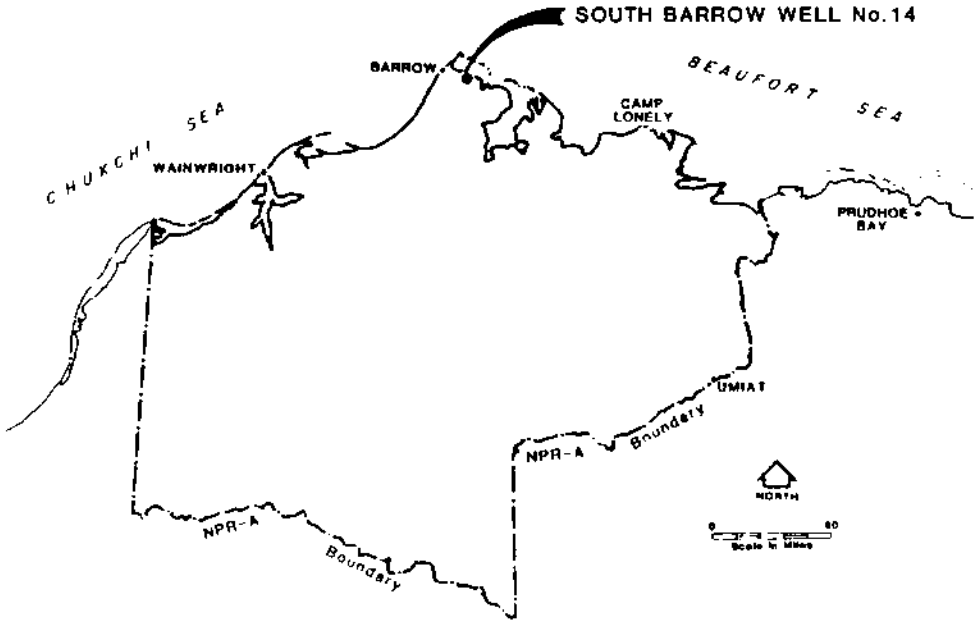


FIGURE 1 - WELL LOCATION MAP - SOUTH BARROW NO. 14

DRILLING SUMMARY

Field operations at the South Barrow No. 14 location were started on November 20, 1976, with the mobilization of construction crews and equipment required to build the drilling pad. The rig move from South Barrow No. 13 began on January 18, 1977, and actual placement of components and rig-up began the same day. Rig-up was completed in 10 days and the well spudded at 1:30 a.m., January 28, 1977.

Rig move operations were delayed somewhat due to the unavailability of equipment and condition of the support equipment used in the rig move. Some time was also lost during the drilling of the conductor hole. The locking pin which connected the drive sub to the auger dropped out resulting in a fishing job to retrieve the auger. The conductor hole was drilled to 53' KB, and 20" conductor was set and cemented to surface with 53 sacks of Permafrost cement. A 16" annular blowout preventer and diverter lines were installed on the 20" conductor.

A 13-1/2" hole was drilled from 53' to 1048'. Two 13-1/2" stabilizers were run in the drill string to limit deviation. The hole was logged from 1048' to the bottom of the 20" conductor with a DIL/SP and a BHC-Sonic/GR. After logging, 10-3/4" surface casing was run and landed at 1042'. The casing was cemented to surface with 760 sacks of Permafrost cement.

A 10" 3,000 psi blowout-preventer stack was installed on the 10-3/4" casing. Choke manifold and kill lines were also installed. The casing, blowout preventer, choke and kill lines were tested to 1,250 psi. The casing was drilled out with an 8-1/2" bit and the formation was tested to a 0.68 psi/ft. equivalent gradient.

An 8-1/2" hole was drilled to 1950'. The well was logged from 1950' back into the 10-3/4" shoe at 1042' as follows: DIL/SP; BHC-Sonic/GR; FDC/CNL/CAL/GR; and HDT-Dipmeter. The sidewall-core gun initially would not go below 1050'. The hole was conditioned and deepened to 1955'. The sidewall-core gun was again run, ten cores were shot and ten were recovered.

A 7" intermediate production casing string was run to 1947' and cemented to surface with 760 sacks Permafrost cement, tailed in with 125 sacks Class "G" cement. The float collar and shoe joint were drilled out leaving five feet of cement above the shoe. A CBL/VDL/CCL/GR log was run and it indicated an acceptable cement job behind the casing. In order to minimize possible formation damage, a calcium chloride-ligno-sulfonate mud system was mixed. To accomplish the mixing and conversion to the inhibitive mud, the mud mixing system had to be rebuilt and modified. The mud guns, jets, and mud line to the hopper were modified, requiring approximately one day to change over the mud.

The tubing head and blowout preventer had been nippled up prior to cleaning out the 7" casing. The casing and blowout preventer were tested to 1,250 psi. The shoe was drilled out with a 6" bit. The formation was tested to a 0.78 psi/ft. equivalent gradient.

A 6" hole was drilled from 1955' to 2257'. Drill Stem Test No. 1 was conducted on the way down over the interval 1947' to 2100', with a packer set in the 7" casing at 1890'. A 500 psi nitrogen cushion was used and bled off when the tool was opened to eliminate a sudden pressure differential on the formation. In summary, the well flowed gas at an approximate rate of 2.5 MMCFPD during the final flow period of the test.

A lost-circulation/gas-kick situation developed at 2257' while attempting to cut a core. The core barrel packed off while trying to break circulation on bottom and 60 barrels of mud were lost. The core barrel was pulled into the 7" shoe at 1947' and, while building mud weight and volume, the well kicked. Approximately 69 hours rig time were used to bring the well under control and a total of 550 barrels of mud were lost. The well was controlled with a 10.7 ppg mud containing 30% lost-circulation material. After controlling the well, an open-hole plug of 25 sacks of Class "G" cement (with 2% calcium-chloride accelerator) was spotted at 2257'. The top of the plug was tagged at 2114' and polished off to 2128'.

The open hole was logged from 2128' back into the casing shoe at 1947' as follows: DIL/SP; BHC-Sonic/GR; FDC/CNL/CAL/GR; DLL/SP; MLL; HDT-Dipmeter. Shot 11 sidewall cores and recovered 11.

At the conclusion of logging, the top of the plug was found at 2191', 63' deeper than its original depth. A second plug of 15 sacks of accelerated Class "G" cement was spotted at 2191' and the top dressed to 2130'. The lost-circulation material was cleaned from the mud system.

The hole was conditioned and a 5-1/2" slotted liner was run. On the first attempt, it would not go below 700'. After pulling it and repairing the Brown Oil Tools liner hanger and packer assembly, the liner was rerun and hung with the shoe at 2125'. The hanger was at 1826' and the packer at 1822'. The blowout preventers were tested to 1,400 psi and 2-7/8" tubing run to 2079' (tail 12' below lowest slots in 5-1/2" liner). The tree was nippled up and tested to 3,000 psi.

Preparations were made to conduct a multi-point back-pressure test on the well. The mud was reversed to calcium-chloride water in an attempt to flow the well. This failed, the calcium-chloride water was displaced with nitrogen to 600 psi, and the nitrogen bled off to bring the well in. The well was cleaned up by alternating the gas flow through the tubing and the annulus. Alcohol was injected into the tubing and annulus to prevent hydrate formation. The multi-point test was run and a 72-hour pressure buildup taken with bottom-hole recorders hung at 2073' on a wire line. At the conclusion of buildup, a static gradient survey was conducted. Calculated absolute open flow was 3.7 MMCFGPD. The test is detailed in Appendix I. Also, an analysis of gas recovered is in Appendix II.

After testing, the well was completed. The well was killed with 10.8 ppg calcium-chloride water and blowout preventers were nippled up and tested to 1,250 psi. The tubing was pulled, a retrievable bridge plug was run on the tubing, and was set at 1772'. One joint of tubing was laid down

and the tubing string was hung at 1754', with the bridge plug running tool on the bottom. The tree was nippled up and tested to 3,000 psi. The rig was released at 7:00 a.m., March 1, 1977.

A wellhead shelter was constructed and placed over the wellhead.

All logs from the South Barrow Gas Field were recorded on magnetic tape, and computer log interpretation presentations were prepared using Schlumberger's Saraband synergetic log system. The hole was, for all practical purposes, "straight". The maximum deviation of 1-3/4° occurred at 2182' in the 6" hole. The remainder of the hole was drilled at 1° or less deviation.

Detailed drilling information, in the form of bit records, mud summary, time analysis, and casing and cementing reports, is included in the body of this report.

AMENDED

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. TYPE OF WELL: OIL WELL [ ] GAS WELL [X] OTHER — SINGLE ZONE [X] MULTIPLE ZONE [ ]

2. NAME OF OPERATOR: Husky Oil NPR Operations, Inc.

3. ADDRESS OF OPERATOR: 3201 C Street, Suite 600, Anchorage, AK 99503

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 2300' FWL, 1800' FNL, Sec 25, T22N, R17W
At proposed prod. zone: Same as above

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: Approximately 11.5 miles ESE of Barrow, AK

5. LEASE DESIGNATION AND SERIAL NO.: None

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: None

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Nav 1 Petroleum Reserve No. 4

9. WELL NO.: South Barrow Well No. 14

10. FIELD AND POOL, OR WILDCAT: East Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 25, T22N, R17W

12. COUNTY OR PARISH: North Slope Borough | 13. STATE: Alaska

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): N/A

16. NO. OF ACRES IN LEASE: 23,680,000

17. NO. OF ACRES ASSIGNED TO THIS WELL: N/A

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 4750'

19. PROPOSED DEPTH: 2500'

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): Ground = 12'; Pad = 17'; KB = 31'

22. APPROX. DATE WORK WILL START*: January 15, 1976

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
26"	20"	133#	80'	To surface
14 3/4"	10 3/4"	51#	1200'	To surface ± 2500 sx
8 1/2"	7"	32#	2500'	To surface ± 600 sx

This form is filed for information only. Please refer to letter from the Director, Naval Petroleum and Oil Shale Reserves, Serial # 394, August 27, 1968.

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE
411 W. 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED J. M. McCarthy TITLE Drilling Engineer DATE 12-13-76

(This space for Federal or State office use)

PERMIT NO. APPROVAL DATE

Accepted for the record: Mike J. Hauser acting TITLE Dist. Supervisor DATE 1/18/83

CONDITIONS OF APPROVAL, IF ANY:

THIS AMENDS ORIGINAL DATED DECEMBER 13, 1976. AMENDED 1/14/83

AMENDED

Form 10 – 401
REV. 1-1-71

SUBMIT IN TRIPLICATE
(Other instructions on reverse side)

STATE OF ALASKA

OIL AND GAS CONSERVATION COMMITTEE

PERMIT TO DRILL OR DEEPEN

1a. TYPE OF WORK: DRILL ☒ DEEPEN ☐

b. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ OTHER ☐ SINGLE ZONE ☒ MULTIPLE ZONE ☐

2. NAME OF OPERATOR: Husky Oil NPR Operations, Inc.

3. ADDRESS OF OPERATOR: 3201 C Street, Suite 600, Anchorage, AK 99503

4. LOCATION OF WELL
At surface: 2300' FWL, 1800' FNL, Sec. 25, T22N, R17W
At proposed prod. zone: Same as above.

13. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: Approximately 11.5 miles ESE of Barrow, AK

14. BOND INFORMATION
TYPE: Surety and/or No. None
Amount:

5. LEASE DESIGNATION AND SERIAL NO.: None

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: None

8. UNIT FARM OR LEASE NAME: Naval Petroleum Reserve No. 4

9. WELL NO.: South Barrow Well No. 14

10. FIELD AND POOL, OR WILDCAT: East Barrow Gas Field

11. SEC., T., R., M., (BOTTOM HOLE OBJECTIVE): Sec. 25, T22N, R17W

12.: North Slope Borough

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit, if any): N/A

16. NO. OF ACRES IN LEASE: 23,680,000

17. NO. ACRES ASSIGNED TO THIS WELL: N/A

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL DRILLING, COMPLETED, OR APPLIED FOR, FT: 4750'

19. PROPOSED DEPTH: 2500'

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, CR, etc.): Ground = 12'; Pad = 17'; KB = 31'

22. APPROX. DATE WORK WILL START*: January 15, 1977

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	GRADE	SETTING DEPTH	Quantity of cement
26"	20"	133#	K-55	80'	To surface
14 3/4"	10 3/4"	51#	N-80	1200'	To surface ±2500 sx
8 1/2"	7"	32#	N-80	2500'	To surface ± 600 sx

This form is filed for information only. Please refer to letter from the Director, Naval Petroleum and Oil Shale Reserves, Serial #394, August 27, 1968.

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE
[illegible] 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program.

24. I hereby certify that the Foregoing is True and Correct

SIGNED E. J. McCarthy DATE 12-13-76 TITLE Drilling Engineer

(This space for State office use)

CONDITIONS OF APPROVAL, IF ANY:

SAMPLES AND CORE CHIPS REQUIRED	MUD LOG	OTHER REQUIREMENTS:
☐ YES ☐ NO	☐ YES ☐ NO	
DIRECTIONAL SURVEY REQUIRED	A.P.I. NUMERICAL CODE	
☐ YES ☐ NO	50-023-20009	

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

*See Instructions On Reverse Side

This amends original signed December 13, 1976 Amended 1/14/83

AMENDED

Form 9-331
Dec. 1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well ☐ gas well ☑ other

2. NAME OF OPERATOR
Husky Oil NPR Operations, Inc.

3. ADDRESS OF OPERATOR
3201 C Street, Suite 600, Anchorage, AK

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 2300' FWL, 1800' FNL
AT TOP PROD. INTERVAL: As above
AT TOTAL DEPTH: As above

5. LEASE
N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
N/A

7. UNIT AGREEMENT NAME
Naval Petroleum Reserve No. 4

8. FARM OR LEASE NAME
Naval Petroleum Reserve No. 4

9. WELL NO.
South Barrow Well No. 14

10. FIELD OR WILDCAT NAME
East Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 25, T22N, R17W

12. COUNTY OR PARISH | 13. STATE
North Slope Borough | Alaska

14. API NO.
50-023-20009

15. ELEVATIONS (SHOW DF, KDB, AND WD)
Ground: 12'; Pad: 17'; KB. 31'

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☑		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other)			

(NOTE: Report results of multiple completion or zone change on Form 9-330.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Changes have been made in the So. Barrow No. 14 Well Program. The new program is shown below:

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE
411 W. 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

10 3/4" casing @ 1000' in 13 1/2" hole cemented to surface.
7" casing @ ± 1900' in 8 1/2" hole cemented to surface.
5 1/2" slotted liner at total depth in 6" hole if applicable.

This form is filed for information only. Please refer to letter from the Director, Naval Petroleum and Oil Shale Reserves, Serial #394, August 27, 1968

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED R. J. Meade TITLE Drilling Manager DATE 2-4-77

(This space for Federal or State office use)

Accepted for the record: APPROVED BY Miller J. Hamre TITLE OIL AND GAS SUPERVISOR DATE 1/18/83
CONDITIONS OF APPROVAL, IF ANY:

This amends original signed February 4, 1977 Amended 1/14/83

*See Instructions on Reverse Side

Form 10-403
REV. 1-10-73

Submit "Intentions" in Triplicate
& "Subsequent Reports" in Duplicate

AMENDED

STATE OF ALASKA
OIL AND GAS CONSERVATION COMMITTEE

5. API NUMERICAL CODE
50-023-20009

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen
Use "APPLICATION FOR PERMIT—" for such proposals.)

6. LEASE DESIGNATION AND SERIAL NO.
None

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. IF INDIAN, ALLOTTEE OR TRIBE NAME
None

2. NAME OF OPERATOR
Husky Oil NPR Operations, Inc.

8. UNIT, FARM OR LEASE NAME
Naval Petroleum Reserve No. 4

3. ADDRESS OF OPERATOR
3201 C Street, Suite 600, Anchorage, AK 99503

9. WELL NO.
South Barrow Well No. 14

4. LOCATION OF WELL
At surface

10. FIELD AND POOL, OR WILDCAT
East Barrow Gas Field

2300' FWL, 1800' FNL, Sec. 25, T22N, R17W

11. SEC., T., R., M., (BOTTOM HOLE OBJECTIVE)
Sec. 25, T22N, R17W

13. ELEVATIONS (Show whether DF, RT, GR, etc.)
Ground = 12'; Pad = 17'; KB = 31'

12. PERMIT NO.
N/A

14. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☒	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)			☐
(Other)			☐	(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

15. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work.

Changes have been made in the So. Barrow No. 14 Well Program. The new program is shown below:

10 3/4" casing @ ± 1000' in 13 1/2" hole cemented to surface.
7" casing @ ± 1900' in 8 1/2" hole cemented to surface.
5 1/2" slotted liner at total depth in 6" hole if applicable.

This form is filed for information only. Please refer to letter from the Director, Naval Petroleum and Oil Shale Reserves, Serial #394, August 27, 1968.

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE
411 W. 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

16. I hereby certify that the foregoing is true and correct

SIGNED R. J. Mead TITLE Drilling Manager DATE 2-4-77

(This space for State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

This amends original signed February 4, 1977 Amended 1/14/83

See Instructions On Reverse Side

AMENDED

Form 9-331
Dec. 1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR
Husky Oil NPR Operations, Inc.

3. ADDRESS OF OPERATOR
3201 C Street, Anchorage, AK 99503

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 2300' FWL, 1800' FNL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

5. LEASE
N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
N/A

7. UNIT AGREEMENT NAME
N/A

8. FARM OR LEASE NAME
Naval Petroleum Reserve No. 4

9. WELL NO.
South Barrow Well No. 14

10. FIELD OR WILDCAT NAME
East Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 25, T22N, R17W

12. COUNTY OR PARISH
North Slope Borough

13. STATE
Alaska

14. API NO.
50-023-0009

15. ELEVATIONS (SHOW DF, KDB, AND WD)
GL - 12'; Pad -17'; KB - 31'

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Progress report.			

(NOTE: Report results of multiple completion or zone change on Form 9-330.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS
JAN 18 1983
MINERALS MANAGEMENT SERVICE
[illegible] 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

1/27/77: Nipple up 16" BOP.
1/28/77: Spudded well at 1:30 a.m. w/13½" bit.
1/29-31/77: Drilled to 1048'. Ran DIL, BHC/Sonic.
2/1/77: Set 10 3/4" 51# k-55 casing at 1042'.
2/2/77: Cemented w/760 sx Permafrost II. Full returns to surface.
2/3/77: Nipped up BOP and drilled out.
2/4-5/77: Drilled to 1950'.
2/5/77: Ran DIL, BHC/Sonic, FDC/CNL, HRD, Sidewall Cores.
2/6-7/77: Ran 7" 32# N-80 to 1947'. Cemented to surface w/760 sx Permafrost II + 125 sx Class "G" with 2% $CaCl_2$. Full returns.
2/8/77: Tested BOP and casing and drilled out.
2/9/77: Ran CBL/VDL/GR/CCL in 7".
2/10-11/77: Drilled to 2100'.
See attached for continuation.

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED R T Mead TITLE Drilling Manager DATE 3-16-77

(This space for Federal or State office use)

Accepted for the record: APPROVED BY Will L. Hunt TITLE OIL AND GAS SUPERVISOR DATE 1/18/83

CONDITIONS OF APPROVAL, IF ANY:

This amends original signed March 16, 1977 Amended 1/14/83

*See Instructions on Reverse Side

AMENDED

Sundry Notices and Reports on Wells
Naval Petroleum Reserve No. 4
South Barrow Well No. 14
March 16, 1977

17. (Continued)

2/12/77: Ran DST No. 1 1890'-2100'. Opened tool w/mud to surface in six minutes. Flowed at 2.4 mm CF on 3/8" choke w/700#.
2/13/77: Drilled ahead to 2200'.
2/14/77: Drilled ahead to 2257'. Lost circulation.
2/18/77: Set cement plug at 2257' to 2114' w/25 sacks "G", 2% C_ACl.
2/19/77: Drilled cement to 2128'. Logged with DIL, BHC Sonic, FDC/CNL, MLL, HRD, shot 10 sidewall cores, recovered 10.
2/20/77: Set cement plug at 2191' w/15 sacks Class "G", 2% C_ACl.
2/21/77: Drilled out cement to 2130'.
2/22/77: Ran 5½" slotted liner at 2125', hanger at 1826', packer at 1822'.
2/23-3/1/77: Brought well in and ran four point test and 72 hour buildup. Killed well with 10.7# calcium chloride water. Set retainer at 1772'. Landed tubing at 1754'. Rig released.

Amended 1/14/83

Form 10-403
REV. 1-10-73

Submit "Intentions" in Triplicate
& "Subsequent Reports" in Duplicate

AMENDED

STATE OF ALASKA
OIL AND GAS CONSERVATION COMMITTEE

5. API NUMERICAL CODE: N/A

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen
Use "APPLICATION FOR PERMIT—" for such proposals.)

6. LEASE DESIGNATION AND SERIAL NO.: N/A

1. OIL WELL ☐ GAS WELL ☒ OTHER

7. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

2. NAME OF OPERATOR: Husky Oil NPR Operations, Inc.

8. UNIT, FARM OR LEASE NAME: Naval Petroleum Reserve No. 4

3. ADDRESS OF OPERATOR: 3201 C Street, Anchorage, AK 99503

9. WELL NO.: South Barrow Well No. 14

4. LOCATION OF WELL
At surface: 2300' FWL, 1800' FNL

10. FIELD AND POOL, OR WILDCAT: East Barrow Gas Field

11. SEC., T., R., M., (BOTTOM HOLE OBJECTIVE): Sec 25, T22N, R17W

13. ELEVATIONS (Show whether DF, RT, GR, etc.): GL - 12'; Pad - 17'; KB - 31'

12. PERMIT NO.: N/A

14. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)			☐
(Other) Progress report.	☐			(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

15. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work.

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE

1/27/77: Nipple up 16" BOP.
1/28/77: Spudded well at 1:30 a.m. w/13½" bit.
1/29-31/77: Drilled to 1048'. Ran DIL, BHC/Sonic.
2/1/77: Set 10 3/4" 51# k-55 casing at 1042'.
2/2/77: Cemented w/760 sx Permafrost II. Full returns to surface.
2/3/77: Nippled up BOP and drilled out.
2/4-5/77: Drilled to 1950'.
2/5/77: Ran DIL, BHC/Sonic, FDC/CNL, HRD, shot 11 sidewall cores, recovered 11.
2/6-7/77: Ran 7" 32# N-80 to 1947'. Cemented to surface w/760 sx Permafrost II + 125 sx Class "G" with 2% $CaCl_2$.
2/8/77: Tested BOP and casing and drilled out.
2/9/77: Ran CBL/VDL/GR/CCL in 7".
2/10-11/77: Drilled to 2100'.
2/12/77: Ran DST No. 1, 1890-2100'. Opened tool w/mud to surface in six minutes. Flowed at 2.4 mm CF on 3/8" choke w/700#.
2/13/77: Drilled ahead to 2200'.
2/14/77: Drilled ahead to 2257'. Lost circulation.
2/18/77: Set cement plug at 2257' to 2114' w/25 sacks "G", 2% C_ACl.
2/19/77: Drilled cement to 2128'. Logged with DIL, BHC Sonic, FDC/CNL, MLL and HRD, shot 10 sidewall cores, recovered 10.

See attached for continuation.

16. I hereby certify that the foregoing is true and correct

SIGNED /s/ R J Mead TITLE Drilling Manager DATE 3-16-77

(This space for State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

This amends original dated March 16, 1977. Amended 1/14/83

See Instructions On Reverse Side

AMENDED

Sundry Notices and Reports on Wells
Naval Petroleum Reserve No. 4
South Barrow Well No. 14
March 16, 1977

2/20/77: Set cement plug at 2191' w/15 sacks Class "G", 2% $CaCl$.
2/21/77: Drilled out cement to 2130'.
2/22/77: Ran 5½" slotted liner at 2125', hanger at 1826', packer at 1822'.
2/23-3/1/77: Brought well in and ran four point test and 72 hour buildup. Killed well with 10.7# calcium chloride water. Set retainer at 1772'. Landed tubing at 1754'. Rig released.

Amended 1/14/83

AMENDED

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ Other

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: Husky Oil NPR Operations, Inc.

3. ADDRESS OF OPERATOR: 3201 C Street, Suite 600, Anchorage, AK 99503

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 2300' FWL, 1800' FNL
At top prod. interval reported below
At total depth: Same

5. LEASE DESIGNATION AND SERIAL NO.: N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

7. UNIT AGREEMENT NAME: N/A

8. FARM OR LEASE NAME: NavalPetroleumReserveNo. 4

9. WELL NO.: So. Barrow No. 14

10. FIELD AND POOL, OR WILDCAT: East Barrow Gas Field

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec 25, T22N, R17W

14. PERMIT NO.: N/A — DATE ISSUED:

12. COUNTY OR PARISH: North Slope — 13. STATE: Alaska

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
1/28/77	2/14/77	3/1/77	GL: 12'; Pad: 17'; KB: 30'	N/A

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
2257'	2130'	N/A	→	0-2257	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 2130-1947'; Barrow Sand

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: DIL, BHC/Sonic/GR, HRD, MML, FDC/CNL, SWC, CBL/VDL

27. WAS WELL CORED: No

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20"	133	53	26"	None	-0-
10-3/4"	51	1042'	13-1/2"	760 sx Permafrost II	-0-
7"	32	1947'	8-1/2"	760 sx Permafrost II + 125 sx Class "G" with 2% $CaCl_2$	-0-

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
5 1/2"	1822'	2125'	-0-	N/A

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2 7/8"	1754'	None

RECEIVED
DENVER MINERALS MANAGEMENT SERVICE
ANCHORAGE, ALASKA

31. PERFORATION RECORD (Interval, size and number): None

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
	JAN 19 1983

MINERALS MANAGEMENT SERVICE
411 W. 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
2/24/76	Flowing	Shut in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
2/12/77	2	3/8"		-0-	Rate of 2.5 MMCFGPD	-0-	N/A

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
700#	-0-		-0-	Rate of 2.5 MMCFGPD	-0-	N/A

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): N/A — TEST WITNESSED BY: N/A

35. LIST OF ATTACHMENTS: None

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED R. J. Mead — TITLE Drilling Manager — DATE 3-16-77

*(See Instructions and Spaces for Additional Data on Reverse Side)

OFFICE OF OIL & GAS SUPERVISOR, ANCHORAGE, ALASKA.
This amends original signed March 16, 1977 — Amended 1/14/83

AMENDED

Form P-7

SUBMIT IN DUPLICATE*
(See other instructions on reverse side)

STATE OF ALASKA
OIL AND GAS CONSERVATION COMMITTEE

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. API NUMERICAL CODE: 50-023-20009

6. LEASE DESIGNATION AND SERIAL NO.: N/A

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ Other

7. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

8. UNIT, FARM OR LEASE NAME: NavalPetroleumReserveNo. 4

2. NAME OF OPERATOR: Husky Oil NPR Operations, Inc.

9. WELL NO.: South Barrow Well No. 14

3. ADDRESS OF OPERATOR: 3201 C Street, Suite 600, Anchorage, AK 99503

10. FIELD AND POOL, OR WILDCAT: East Barrow Gas Field

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 2300' FWL, 1800' FNL
At top prod. interval reported below
At total depth: Same

DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE
ANCHORAGE, ALASKA 99501

11. SEC., T., R., M., (BOTTOM HOLE OBJECTIVE): Sec 25, T22N, R17W

12. PERMIT NO.: N/A

13. DATE SPUDDED	14. DATE T.D. REACHED	15. DATE COMP. SUSP. OR ABAND.	16. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	17. ELEV. CASINGHEAD
1/28/77	2/14/77	3/1/77	GL: 12'; Pad: 17'; KB: 31'	N/A

18. TOTAL DEPTH, MD & TVD	19. PLUG, BACK MD & TVD	20. IF MULTIPLE COMPL., HOW MANY*	21. ROTARY TOOLS	INTERVALS DRILLED BY	CABLE TOOLS
2257'	2130'	N/A	0-2257		

22. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 2130-1947'; Barrow Sand

23. WAS DIRECTIONAL SURVEY MADE: No

24. TYPE ELECTRIC AND OTHER LOGS RUN: DIL, BHC/Sonic/GR, HRD, MML, FDC/CNL, SWC, CBL/VDL

25. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB/FT.	GRADE	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20"	133	K-55	53'	26"	None	-0-
10-3/4"	51	N-80	1042'	13-1/2"	760 sx Permafrost II	-0-
7"	32	N-80	1947'	8-1/2"	760 sx Permafrost II + 125 sx Class "G" with 2% $CaCl_2$	-0-

26. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
5 1/2"	1822'	2125'	-0-	N/A

27. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2 7/8"	1754'	None

28. PERFORATIONS OPEN TO PRODUCTION (Interval, size and number): None

29. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED

30. PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
2/24/76	Flowing	Shut in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
2/12/77	2	3/8"		-0-	N/A	-0-	-0-

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
700#	-0-		-0-	Rated 2.5 MMCFGPD	-0-	

31. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): N/A

TEST WITNESSED BY:

32. LIST OF ATTACHMENTS: None

33. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED /s/ R J Mead TITLE Drilling Manager DATE 3-16-77

*(See Instructions and Spaces for Additional Data on Reverse Side)

DIVISION OF OIL & GAS CONSERVATION, ANCHORAGE, AK,
This amends original signed March 16, 1977 Amended 1/14/83

AMENDED

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9–331–C for such proposals.)

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR: National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

3. ADDRESS OF OPERATOR: 2525 C Street, Suite 400, Anchorage, AK 99503

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 2300' FWL; 1800' FNL
AT TOP PROD. INTERVAL: Same
AT TOTAL DEPTH: Same

5. LEASE: N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

7. UNIT AGREEMENT NAME: N/A

8. FARM OR LEASE NAME: National Petroleum Reserve in Alaska

9. WELL NO.: South Barrow Well No. 14

10. FIELD OR WILDCAT NAME: East Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec 25, T22N, R17W, UM

12. COUNTY OR PARISH: North Slope | 13. STATE: Alaska

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD): 31' KB

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

NOTICE OF INTENT TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Re-enter and Activate Suspended Well			

(NOTE: Report results of multiple completion or zone change on Form 9–330.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Operation: Re-enter and clean up well, install production tubing and test well. See attached completion procedure for details.

Starting Date: February 23, 1979

RECEIVED
DEPUTY MINERALS MANAGER
ONSHORE FIELD OPERATIONS

JAN 18 1983

MINERALS MANAGEMENT SERVICE
411 W. 4TH AVE., SUITE 2A
ANCHORAGE, ALASKA 99501

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED Mark Crews TITLE Chief of Operations DATE 17 January 1983

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

William P. Turner TITLE Actg Dist Supv DATE 1/18/83

This amends original signed Amended 1/14/83

*See Instructions on Reverse Side

AMENDED

Form 9-330
(Nov. 6-48)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☒ DRY ☐ Other

7. UNIT AGREEMENT NAME: N/A

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☒ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other Install production tubing.

8. FARM OR LEASE NAME: National Petroleum Reserve in AK

2. NAME OF OPERATOR: National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

9. WELL NO.: So. Barrow Well No. 14

3. ADDRESS OF OPERATOR: 2525 C Street, Suite 400, Anchorage, AK 99503

10. FIELD AND POOL, OR WILDCAT: East Barrow Gas Field

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 2300' FWL, 1800' FNL
At top prod. interval reported below
At total depth: Same

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec 25, T22N, R17W

14. PERMIT NO.: N/A — DATE ISSUED:

12. COUNTY OR PARISH: North Slope — 13. STATE: Alaska

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
1/28/77	2/14/77	3/1/77	GL: 12'; Pad: 17'; KB: 31'	N/A

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
2257'	2130'	N/A	→	0-2257	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 2130-1947'; Barrow Sand

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: DIL, BHC/Sonic/GR, HRD, MML, FDC/CNL, SWC, CBL/VDL

27. WAS WELL CORED: No

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20"	133	53'	26"	None	-0-
10-3/4"	51	1042'	13-1/2"	760 Sx Permafrost II	-0-
7"	32	1947'	8-1/2"	760 sx Permafrost II + 125 sx Class "G" with 2% $CaCl_2$	-0-

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
5 1/2"	1822'	2125'	-0-	N/A

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2 7/8"	2108.76'	None

31. PERFORATION RECORD (*Interval, size and number*): None

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED

RECEIVED
JAN 18 1983
CASPER FIELD OPERATIONS
MINERALS MANAGEMENT SERVICE
ANCHORAGE, ALASKA

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)
2/24/77	Flowing	Shut-in

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
2/27/79	8	16/64			282.8		

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
767 psig	727.7 psig			1223.9		

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*): Vented

TEST WITNESSED BY:

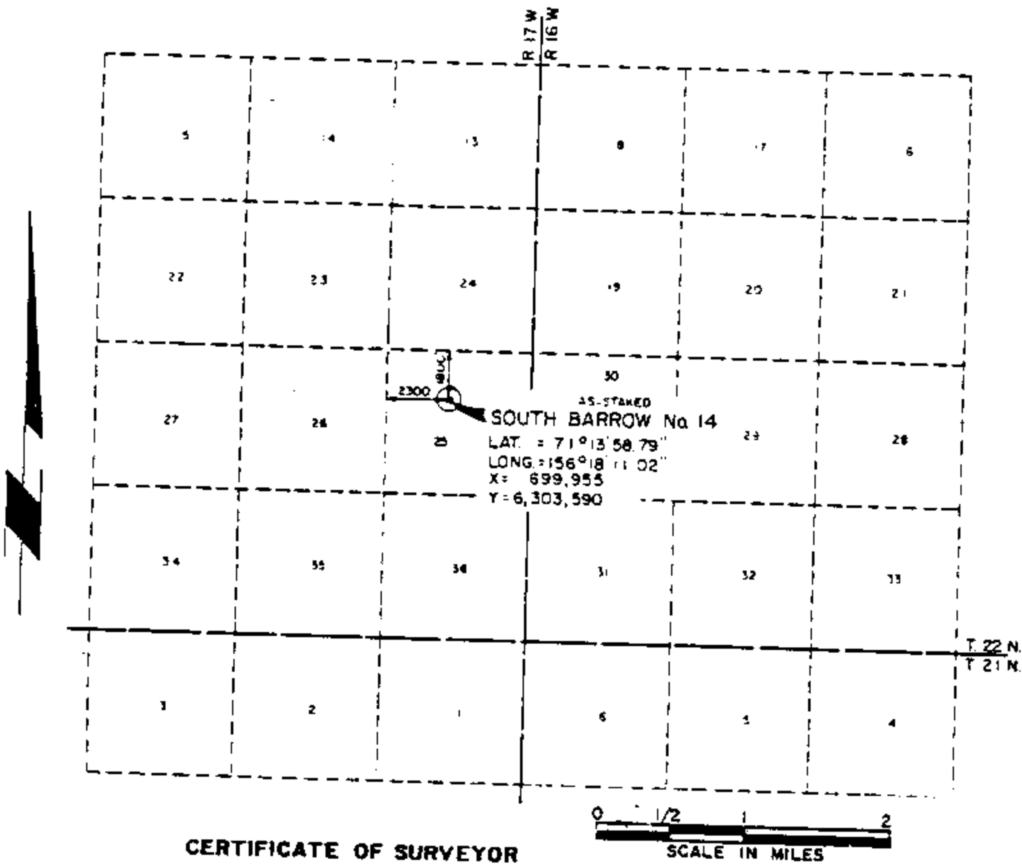
35. LIST OF ATTACHMENTS:

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED Max V. Lewis TITLE Chief of Operations, ONPRA DATE 14 January 1983

*(See Instructions and Spaces for Additional Data on Reverse Side)

This amends original signed — Amended 1/14/83



CERTIFICATE OF SURVEYOR

I hereby certify that I am properly registered and licensed to practice land surveying in the State of Alaska and that this plat represents a location survey made by me or under my supervision, and that all dimensions and other details are correct.

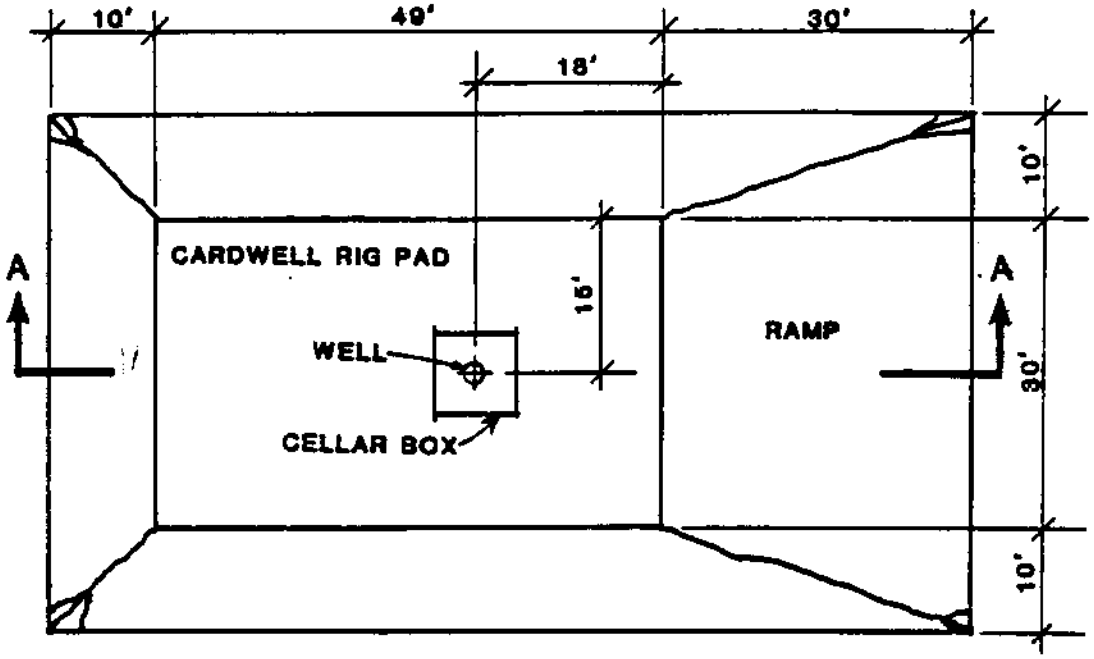
Aug. 18-76 — Date

[signature] — SURVEYOR

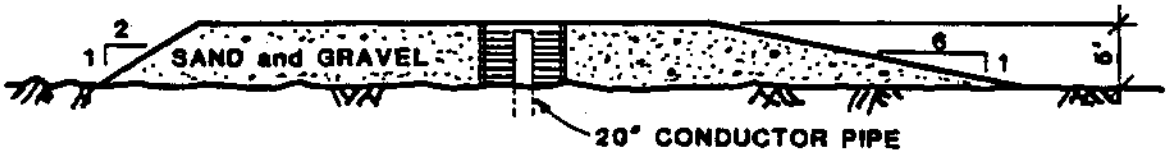
STATE OF ALASKA
49TH
REGISTERED LAND SURVEYOR

C.J.R.

AS-STAKED
SOUTH BARROW No. 14
Located in
Surveyed for
HUSKY OIL
NPR OPERATIONS
Surveyed by
F M LINDSEY & ASSOC.
LAND & HYDROGRAPHIC SURVEYORS
2502 West Northern Lights Boulevard Box 4 Anchorage Alaska



PLAN VIEW



SECTION A-A

SOUTH BARROW NO. 14 DRILL PAD

OPERATIONS HISTORY

DATE AND FOOTAGE DRILLED AS OF 6:00 A.M.	ACTIVITY
1/18/77	Waiting on ITT Cats to move rig and C-250 pump house.
1/19/77	Attempted to pull rig off No. 13 pad. One corner of rig iced in. Boiler down. Chipped ice from rig. Moved C-250 pump house and three sleds to No. 14 site. Unloaded sleds at No. 14.
1/20/77	Moved and set rig. Moved and set C-250 pump house. Moved five sleds of miscellaneous equipment. Moved four camp units.
1/21/77	Rigging up. Moving camp.
1/22/77	Moving main camp. Last four sleeper units being tied in. Heat to main camp at 12:00 midnight. Continuing rig-up.
1/23/77	Continuing camp set up; 90% complete. Continuing rig-up; 80% complete.
1/24/77	Camp 100% complete. Rig 95% complete. Preparing to drill conductor hole.
1/25/77	Rig up completed. Drilled conductor with 26" auger. Pilot bit worn out. Drilled pilot hole with bit. Opened hole with auger to 26".
1/26/77	Drilled 26" conductor hole. Lock pin connecting drive sub to auger dropped out. Fished out auger. Continued drilling conductor hole to 53' KB.
1/27/77	Ran one joint 20", 133# conductor and landed at 53' KB. Cut off and welded on OCT 20" 2,000 psi casing head. Cemented with 53 sacks Permafrost II. Waited on cement. Nippled up 16" Hydril. Filled mud tanks with water.
1/28/77	Nippled up 20" blowout preventer and mixed spud mud while waiting on cement. Spudded well at 1:30 a.m., January 28, 1977. Drilled to 104'. Repaired swivel.

1/29/77	Repaired goose neck on swivel. Drilled to 324' survey. Pulled out of hole. Picked up stabilizers. Ran in hole. Drilled ahead. Repaired swivel and washed out mud line. Drilling ahead.
1/30/77	Drilled ahead to 707'. Pulled out of hole. Serviced rig. Ran in hole. Conditioned mud and drilled ahead. Pulled out of hole and changed out swivel. Drilled ahead.
1/31/77	Drilled to 1048'. Circulated. Pulled out of hole. Steel-line measured, log run DIL, BHC-Sonic/GR, ran in hole. Cut drilling line. Repaired pump. Circulated and conditioned hole.
2/1/77	Circulated and conditioned mud. Rigged up and ran 10-3/4" casing, 34 joints, 51#, R-2. Landed at 1042'; float at 1006'. Circulated casing, cut off landing joint. Ran 3-1/2" drill pipe. Circulated casing through duplex collar.
2/2/77	Circulated casing. Cemented as follows: 20 barrels water, 760 sacks of Permafrost II at 14.8 ppg. Cemented until returns were 14 ppg. Full returns to surface. Displaced with 8 barrels water. Cement in place at 12:15 p.m., 2/1/77. Waited on cement. Cleaned mud tanks, changed liners.
2/3/77	Waited on cement. Nippled down 16" stack. Nippled up 10" stack. Mixed mud.
2/4/77	Nippled up 10" stack. Tested blinds and choke to 1,250 psi. Ran in hole with bit. Tested pipe and Hydril to 1,250 psi. Drilled float at 1006'. Cement at 1024'; shoe at 1042'. Tested shoe to 200 psi. Drilled, repaired pump, drilled. Unplugged flowline, surveyed.
2/5/77	Ran in hole with Bit No. 3. Drilled ahead. Repaired pump. Drilled ahead. Repaired swivel. Drilled to 1950'. Circulated and conditioned hole. Tight hole. Conditioned hole. Steel-line measured. Ran DIL, BHC-Sonic/GR.
2/6/77	Logging. Ran DIL, FDC/CNL, BHC-Sonic, HRD. Attempted to run sidewall cores. Guns stopped at 1050'. Ran in hole. Drilled to 1955' and conditioned mud. Pulled out of hole. Rigged up Schlumberger. Ran sidewall cores at 1652', 1650', 1647', 1618', 1616', 1614', 1578', 1576', 1553', 1548'. Full recovery. Ran in hole with drill collars and laid down same. Changed pipe rams and rigged up to run casing.

2/7/77	Ran 48 joints 7", 32#, R3 LT&C casing. Shoe at 1947.6'. Duplex collar at 1899'. Circulated. Ran in hole with drill pipe and stab-in. Stab in and circulated. Cemented with 15 barrels water, 760 sacks Permafrost II (14.8-15 ppg) (14.6-14.8 returns) plus 125 sacks Class G. Displaced with 13 barrels water. Pulled loose and equalized. Pulled out of hole. Raised blowout preventer and set casing slips with 80,000 pounds.
2/8/77	Waited on cement. Nippled up. Tested pack-off to 3,000 psi. Slip seal leaked. Nippled up blowout preventer. Changed pipe rams and kelly. Picked up bottom-hole assembly, ran in hole, drilled float collar at 1899'. Hard cement below float. Drilled cement.
2/9/77	Circulated and conditioned mud. Pulled out of hole. Rigged up Schlumberger and ran CBL/VDL/GR/CCL log. Cleaned mud pits. Mixed mud.
2/10/77	Mixed mud. Built calcium-chloride-spersene mud to 12 ppg. Rebuilt mud mixing system. Ran 7" line from pump to hopper. Revamped mud guns and jets. Continued mixing mud.
2/11/77	Circulated and conditioned mud. Tested pipe rams and Hydril to 1,250 psi. OK. Drilled out shoe. Tested formation to 300 psi over 12 ppg. Mud OK. Drilled from 1955-2100'. Circulated and conditioned for drill-stem test. Pulled out of hole. Steel-line measured. Laid down 26 joints drill pipe, pulled out of hole. Picked up Howco drill-stem test tools. Ran in hole with drill-stem test tools.
2/12/77	Finished running in hole with drill-stem test tools. Tested lines and manifold to 1,500 psi. Loaded drill pipe with nitrogen to 500 psi. Set packer at 1890'. Opened tool at 9:34 a.m. Mud to surface at 9:40 a.m. Pulled chokes. Closed in for initial build-up at 9:58 a.m. Opened tool at 10:28 a.m. on 3/8" choke. Initial pressure: 180 psi. Built during test to 700 psi and stable at 700 psi last 15 minutes of flow. Closed in at 12:33 p.m. Ran pressure build-up to 5:12 p.m. Dropped bar and reversed out drill pipe while shut in. Circulated and conditioned mud. Pulled out of hole. Laid down test tools. Ran in hole with Bit No. 5.
2/13/77	Circulated and conditioned mud. Drilled. Repaired pump. Resumed drilling to 2182'. Dropped survey, pulled out of hole, steel-line measured. Ran in hole, circulated. Drilled to 2200'.

2/14/77 Worked on C-250 pump. Drilled to 2222'. Lost 80 barrels mud over shaker. Built mud volume and circulated. Drilled to 2257'. Circulated to core. Pulled out of hole. Picked up core barrel. Ran in hole. Broke circulation. Packed off. Lost 60 barrels mud. Picked up to shoe. Mixed mud, built volume.

2/15/77 Built mud volume. Well kicked, closed blowout preventer. Circulated out gas bubbles. Pumped 11.3 ppg lost-circulation material pill down drill pipe. Spotted on bottom; no returns. Built mud volume. Pumped 45 barrels lost-circulation material down annulus; could not fill hole. Pumped 11.0 ppg lost-circulation material down drill pipe; spotted on bottom; no returns. Total mud lost last 24 hours: 180 barrels.

2/16/77 Built mud volume. Added 20% lost-circulation material. Mud weight: 10.5 ppg. Filled annulus, pumped down drill pipe, started circulating. Started to build weight to 11 ppg. Lost circulation. Build mud volume. Mud weight 10.7 ppg with 30% lost-circulation material. Repaired pump. Filled annulus. Mud lost last 24 hours: 210 barrels. Total mud lost: 450 barrels.

2/17/77 Circulated and built mud weight to 10.8 ppg. Lost ±100 barrels. Mixed mud and lost-circulation material. Filled pits with 10.7 ppg mud. Circulated hole with 10.7 ppg mud. Pulled out of hole, laid down core barrel. Picked up Howco bridge plug. Set at 30'. Washed out and filled blowout preventer with $CaCl_2$ water. Tested blowout preventer to 300 psi and 1,200 psi. OK. Retrieved blowout preventer. Ran in hole with bit. Stayed in hole.

2/18/77 Finish trip in with bit. Circulated and conditioned mud. Repaired C-250 pump. Pulled out of hole to shoe. Circulated gas cut mud (cut 10.7 ppg to 10.2 ppg). Repaired pump. Pulled out of hole. Ran in hole open ended, picked up 23 joints drill pipe. Circulated. Worked on C-250 pump. Circulated. Rigged up to cement at 2257'. Cemented with 3 barrels H_2O with 2% $CaCl_2$, 25 sacks Class "G" with 2% $CaCl_2$. Displaced with 14 barrels mud. Cement in place at 2:00 a.m., 2/18/77. Pulled out of hole 9 stands. Circulated and conditioned mud (in 10.7 ppg, out 10.7 ppg). Pulled out of hole.

2/19/77 Ran in hole to 7" casing shoe, circulated out lost-circulation material and waited on cement at 2:00 p.m. Ran in hole, tag cement top at 2114'. Drilled firm cement to 2128'. Circulated bottoms up for logs.

Pulled out of hole. Rigged up Schlumberger to log. Ran DLL/SP, BHC Sonic/GR, FDC/CNL/GR, MLL, Sidewall Cores at 1964', 2003', 2020', 2038', 2050', 2058', 2066', 2080', 2113', 2120', 2133' (logger's depth). Ran high-resolution dipmeter, logging.

2/20/77 Finished logging with high-resolution dipmeter. Ran in hole, steel-line measured, found cement top at 2191'. Circulated and conditioned mud. Pulled out of hole, steel-line measured, ran in hole, steel-line measured, with open-ended drill pipe. Circulated cement with 3 barrels 2% $CaCl_2$, 15 sacks of Class "G" with 2% $CaCl_2$, and 1 barrel of water with 2% $CaCl_2$. Displaced with 14-1/2 barrels mud. Cement in place at 6:15 p.m. Pulled out of hole to shoe. Circulated. Pulled out of hole. Picked up bottom-hole assembly, ran in hole. Circulated at 7" shoe. Waited on cement.

2/21/77 Circulated and waited on cement. Wash and dress plug to 2130'. Good cement. Circulated and built volume. Picked up and washed through Barrow sand interval to wash out lost-circulation material. Laid down drill collars. Rigged up and ran 5-1/2" liner and bottom hanger. Liner stopped at 700'. Pulled out of hole and laid down hanger and liner. Ran in hole and circulated. Machined casing cross-over sub for greater clearance.

2/22/77 Pulled out of hole with drill pipe. Rigged up. Ran 5-1/2" liner on bottom packer and hanger. Shoe at 2125', hanger at 1826', packer at 1822', setting tool at 1818'. Changed rams to 2-7/8. Tested to 1,400 psi. Ran 67 joints 2-7/8". Circulated at 2097'. Landed at 2095' which was 12' below perforations (1916-2083') in slotted liner. Nippled down.

2/23/77 Nippled down blowout preventer. Cleaned pits and filled with water. Built weight to 9.0 ppg. Pulled back-pressure valve and reversed mud out tubing. Well did not flow. Pressured tubing with nitrogen to 600 psi (19 bottles). Returning out annulus. Released nitrogen and well flowed through annulus. Blowing well down to clean up.

2/24/77 Continued to flow well and clean up. Cleaned choke lines and filled with diesel. Alternate flow through tubing and annulus. Shut in and lubricated alcohol down well. Opened to flow: 1/8" choke - 883 psia and 334.75 MCFD; 1/4" choke - 792 psia and 1,254 MCFD; 3/8" choke - well began forming hydrates, flow would not stabilize. Lubricated alcohol down well and blew down.

2/25/77	Continued flowing well on 3/16" choke; 865 psia and 753.5 MCFD. Opened to 3/8" choke; 690 psia and 2,515 MCFD (short-term rate). Well began hydrating in wellbore. Shut in and lubricated alcohol down annulus and tubing. Blew well down. Flowed well on 3/16" choke (865 psia and 753.5 MCFD). Rigged up Camco and pressure tested lubricator to 2,000 psi. Ran two bottom-hole pressure bombs and hung at 2073'. Bombs on bottom at 8:00 p.m. Shut well in for 72-hour buildup at 10:00 p.m., 2/25/77.
2/26/77	Well shut in and Camco bottom-hole pressure bombs hanging at 2073' recording 72-hour buildup. Tree pressure: 860 psig.
2/27/77	Well shut in. Camco bombs hanging at 2073' recording 72-hour pressure buildup.
2/28/77	Well shut in. Camco bombs hanging at 2073' recording 72-hour buildup at 20:00 hours. Pulled out of hole with recorders. Stopping at 1750', 1500', 1000', 500', one-half hour for gradient survey. Killed well with calcium-chloride water. Installed back-pressure valve, nippled down tree.
3/1/77	Nippled up blowout preventer. Tested to 1,250 psi. OK. Circulated tubing. Pulled out of hole with tubing. Picked up Baker Mercury Model K retainer. Ran in hole. Set retainer at 1772'. Laid down one joint tubing. Hung tubing at 1754'. Nippled down blowout preventer. Nippled up tree. Tested seals to 3,000 psi. OK. Cleaned mud pits. Rigging down. Released rig at 7:00 a.m., 3/1/77.

DRILLING TIME ANALYSIS

SOUTH BARROW WELL NO. 14

PARCO, INC., CARDWELL MODEL H

Spudded 1/28/77, Rig Released 3/1/77

Total Depth: 2,257 Feet

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. SOUTH BARROW WELL NO. 14 Page 1 of 3

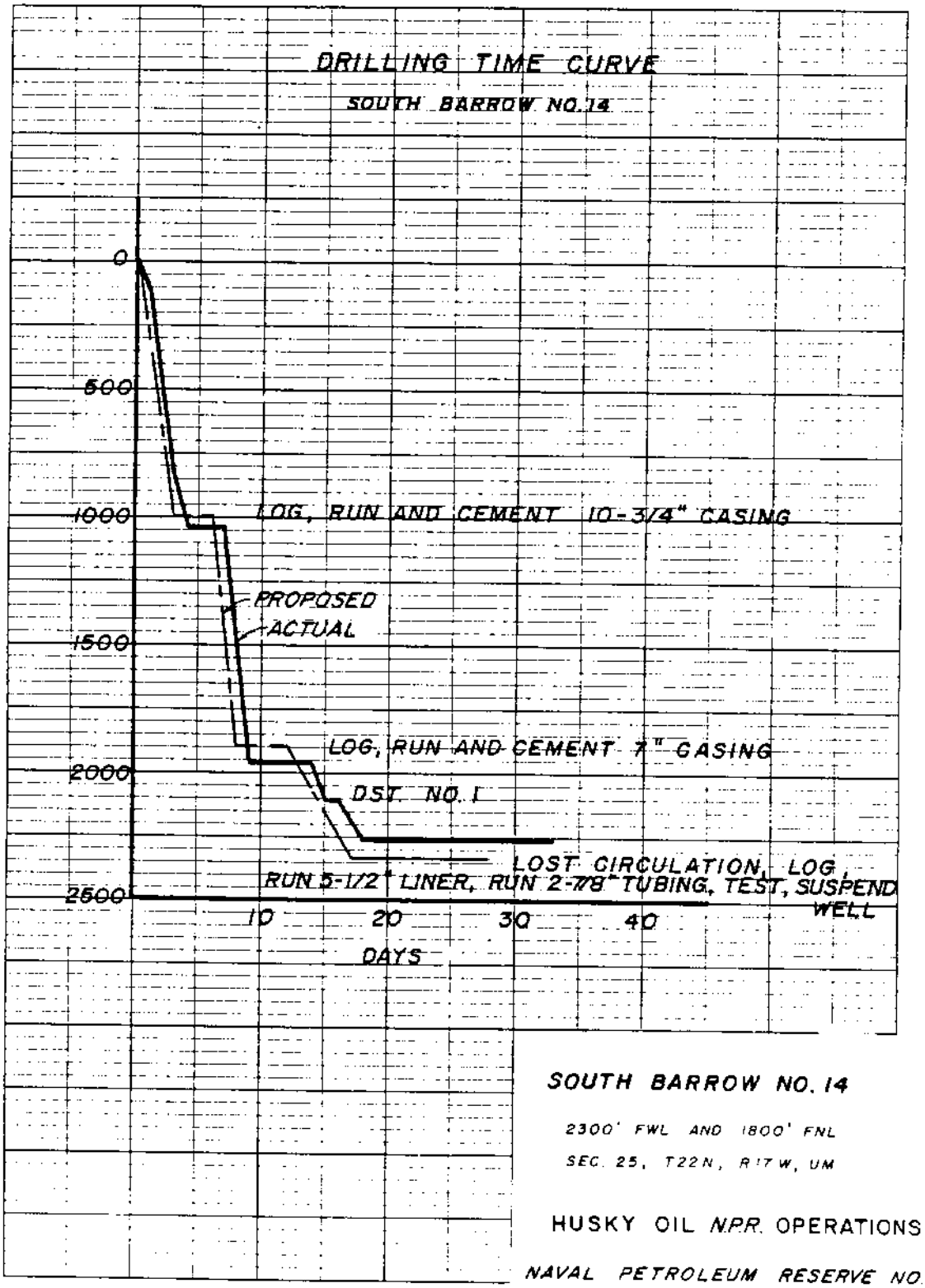
DATE	RIG UP/RIG DOWN	DRILLING	REAMING	TRIP	DEV. SURVEY	RIG MAINT.	RIG REPAIR	CIRC. & COND. MUD	LOGGING	CASING & CEMENT	W O C	NIPPLE UP/DOWN BOP	TEST BOP	CHANGE BHA	LOST CIRC.	FISHING	CORING	DST	PLUG BACK	SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
1977 1-20	24																							Move Rig	
1-21	24																							Rigging Up	
1-22	24																							Rigging Up	Move Camp
1-23	24																							Rigging Up	Set Up Camp
1-24	24																							Rigging Up	
1-25	4	9														11								Drilling 26" Conductor	Hole
1-26		4								4		12				4								Fishing For Auger	
1-27												18										6		Nippling Up Hydril	Set 20" conductor at 53'
1-28		12		6½				½														5		Repacking Swivel	Spudded Well at 1:30 a. m.
1-29		18½		3½				½	½													1		Drilling	
1-30		10½		3½				1	6													2¾		Drilling	
1-31				8¼			½	2½		10½												1¾		Dropped Totco P.O.H. Laid Down Stabilizer	Ran Schlumberger Wireline Logs
2-1				5½						3												15¼		Circulating Casing	Ran 10-3/4" casing. Landed at 1042'.
2-2												11										13		Waiting On Cement	
2-3		6½		3								11	1									2¼		Nipple Up B.O.P.s Install Kill Line & Flow Line	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. SOUTH BARROW WELL NO. 14

DATE	RIG UP/RIG DOWN	DRILLING	REAMING	TRIP	DEV. SURVEY	RIG MAINT.	RIG REPAIR	CIRC. & COND. MUD	LOGGING	CASING & CEMENT	W O C	NIPPLE UP/DOWN BOP	TEST BOP	CHANGE BHA	LOST CIRC.	FISHING	CORING	DST	PLUG BACK	SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
2-4		9½		9¼			¼	2¾															1½	R.I.H. W/Bit No. 3	
2-5		1		4¼				¼	16														2	Logging	Ran Schlumberger Wireline Logs
2-6				3			1	8½		6													5½	Broke Kelly, Changed Rams From 3½" to 7"	Shot 10 sidewall cores, recovered 10. Ran 7" casing at 1947'.
2-7				1½								19½	3											Install Gray Packoff	
2-8		2		8¼				6¾	3½														3	Drill Out Float Collar	
2-9				3¼				13¾	3½														3	Mixing Mud	
2-10								18															6	Mixing & Conditioning Mud	Changed to calcium-chloride, spersene mud.
2-11		8		6				6					2					2						R.I.H. W/Howco DST Tool	
2-12		8½		8¾		1	2	1¾										2						R.I.H. W/Bit No. 5	Ran DST 1955-2100'
2-13		10		6¼			1	6¾																Drilling	
2-14				1½				19									2½						1	Circulate & Condition Mud	T.D. 2257'
2-15								24																Condition Mud For Lost Circulation	
2-16				1			1	22																Regain Circulation Circulate & Condition Mud For P.O.H.	
2-17				10¼			5	6½					1				1¼							Going In Hole w/Bit No. 6	
2-18				6			3¼	4¾		7									½				2½	Laying Down 9" Drill Collars	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. SOUTH BARROWN WELL NO. 14

DATE	RIG UP/RIG DOWN	DRILLING	REAMING	TRIP	DEV. SURVEY	RIG MAINT.	RIG REPAIR	CIRC. & COND. MUD	LOGGING	CASING & CEMENT	W O C	NIPPLE UP/DOWN BOP	TEST BOP	CHANGE BHA	LOST CIRC.	FISHING	CORING	DST	PLUG BACK	SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
2-19				8¼			1½	6¾		7½													¼	Rig Up & Run Dip Meter	
2-20				4			1¾	13¼		4													1	Circulate LCM at SHO 8	
2-21				2¾				6		6													9¼	Circulate & Condition Mud	
2-22								10				12											2	Nipple Down B.O.P.	Ran 5-1/2" liner to 2125'
2-23																							24	Swabbing	
2-24																							24	Testing	
2-25																							24	Well Shut in CAMCO Recorder In Hole	Ran Two B.H.P. Bombs and Hung at 2073'
2-26																							24	Well Shut in CAMCO Recorder In Hole	
2-27																							24	Well Shut In CAMCO Recorder In Hole	
2-28	7			4				2				7	½										3½	Nipple Down Xmas Tree Nipple Up B.O.P.	Killed Well with calcium-chloride water.
3-1	24																							Rigging Down	Rig Released at 7:00 a. m.
3-2	24																								Rigging Down
3-3	24																								Moving Out Rig & Associated Units
	203	-0-	-0-				17¼		29½		-0-		7½	-0-		3¾			½		-0-		207¾		
TOTAL HOURS	100		120½		1		183¾		48		90½		-0-		15		4			-0-	-0-				



SOUTH BARROW NO. 14

2300' FWL AND 1800' FNL

SEC. 25, T22N, R17W, UM

HUSKY OIL *NPR* OPERATIONS

NAVAL PETROLEUM RESERVE NO. 4

DRILLING MUD RECORD

DRILLING MUD RECORD
BAROID DIVISION
N L Industries, Inc.

COMPANY Husky Oil Company (NPR 4) STATE Alaska

WELL South Barrow Well No. 14 COUNTY

CONTRACTOR Parco Drilling Company LOCATION N. Slope (NPR 4) SEC 25 TWP 22N RNG 17W

STOCK POINT Fairbanks, Alaska DATE 02-26-77 BAROID ENGINEER Aimes, Beatty, Rintoul

CASING PROGRAM: 20 inch at 53 ft.
10 3/4 inch at 1042 ft.
7 inch at 1947 ft.
5-1/2" @ 2125' ft.

TOTAL DEPTH 2257' ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	pH	FILTRATION			FILTRATE ANALYSIS				SAND	RETORT			CEC	REMARKS AND TREATMENT
1977	feet	lb/gal	Sec API @ °F	PV @ °F		10 sec / 10 min	Strip @ Meter	ml API	HTHP @ °F	Cake 32nds	PF	MF	Cl ppm	Ca ppm	%	Solids %	Oil %	Water %	Mud, ms/ml	
1-28	98	9.2	33	5	7	3/4	9.0	26.0		1		.2	450	60	TR	6		94		
1-29	452	9.6	37	8	7	5/8	9.0	24.0		2		.2	2000	40	2.5	10		90		Run 2" stream water to contron
--																				DST.
1-30	808	10.3	36	8	4	2/4	9.5	12.0		2		.2	2000	50	.5	12		88		Survey hole. Drill ahead.
1-31	1048	10.1	34	5	4	1/3	8.5	14.8		2		.2	700	20	.25	12		88		POH for log.Circ. to run 10 3/4"
--																				casing.
2-1	1048	10.2	33	5	4	2/4	8.0	12.8		2		0	760	40	.25	12		88		Set 10 3/4" csg. at 1,042'.
2-2	1048																			W.O.C. dump & clean pits. Change
--																				pump liners.
2-3	1048	8.7	30	4	4	2/3	10.5	NC		1		.3	450	20	0	5		95		Nipple up BOP. Mix new mud.
2-4	1348	9.4	37	9	6	4/6	9.5	23.0		2		.2	650	110	.5	8		92		POH for survey tool - A.M.
2-5	1950	10.2	38	13	8	3/6	9.0	6.4		2		.2	650	60	1	12		88		Drilling ahead.
2-6	1955	10.1	35	10	5	2/5	9.0	7.6		1		.2	650	30	.75	12		88		Rig up schlumberger no fill in
--																				hole.
2-7	1955	10.1	34	8	4	1/3	8.8	8.4		1		.1	650	30	.5	12		88		Run 7" csg. to 1,450'.
2-8	1955	10.0	33	7	3	1/3	8.5	8.8		1		.2	650	30	.5	12		88		WOC
2-9	1955																			Dump & clean pits.Mix $CaCl_2$ mud.
2-10	1955	10.1	52	15	8	1/3	11.5	5.0		1			90000	50000		10		90		Mixing $CaCl_2$ mud. Wt. to 12.0 ppg
2-11	2100	12.0	56	20	12	2/5	11.5	5.0		1			90000	50000		10		90		Press.test pipe rams.POH for DST.
2-12	2100	12.0	50	21	19	11/35	10.5	8.2		1	.3	.9	75000	41000	2	16		84		Run DST. RIH with 6" bit.
2-13	2170	12.0	77	40	22	13/40	10.5	3.0		1			107000	55000	3	17		83		Trip for bit @ 2181".Drlg. ahead.
2-14	2257	12.0	50	24	16	8/24	9.0	5.2		1			106000	53000	5	17		83		Trip for core bbl. lost circ.
2-15	Mix	mud	with LCM.		Wait on mud.		Build pit volume.													Lost circ. well kicked.Build
--																				11.0 ppg mud.
2-16	2257	10.7	48				8.0	4.8		½		0	103000		TR	14		86		Lost circ.Build new mud w/25% LCM.
2-17	2257	10.7	61				8.0	5.2		½		.1	104000	50000	TR	14		86		No mud lost on trip out.
2-18	2130	10.7	55				8.0	7.0		½		.1	100000	48000	TR	15		85		Cement plug set on btm.to 2130'.
2-19	2130	10.7	43	24	9	5/12	8.0	6.8		½	.1	1.1	100000	49000	0	13		87		No LCM in mud.
2-20	2130	10.8	45	29	7	5/14	10.5	7.6		½	.5	5.6	100000	80000	0	13		87		Plug didn't set.Circ.& recement.
2-21	2130	10.7	53	31	11	10/16	10.5	8.5		½	.1	0	101000	95000	0	13		87		RIH with 5" liner.
2-22	2130	10.7	49	21	4	3/11	10.0	10.5		½	.1	1.2	102000	92000	0	13		87		Run 2 7/8" tubing.
2-23	2130																			$CaCl_2$ to 9.0 ppg.
2-24	2130																			$CaCl_2$ to 10.7 ppg.
2-25	2130																			$CaCl_2$ to 10.8 ppg.

DRILLING MUD RECORD

BAROID DIVISION

N L Industries, Inc.

COMPANY Husky Oil Company (NPR 4) STATE Alaska

WELL South Barrow Well No. 14 COUNTY ___

CONTRACTOR Parco Drilling Company LOCATION NPR 4 SEC 25 TWP 22N RNG 17W

STOCKPOINT Fairbanks, Alaska DATE 2-26-77 BAROID ENGINEER Aimes, Beatty, Rintoul

CASING PROGRAM: 20 inch at 53 ft.
10 3/4 inch at 1042 ft.
7 inch at 1947 ft.
5-1/2" 2257', 2125' ft.
TOTAL DEPTH ft.

DATE	DEPTH feet	WEIGHT lb/gal	VISCOSITY Sec API @ °F	PV @ °F	Yp	GELS 10 sec / 10 min	pH Strip ☐ Meter ☐	FILTRATION ml API	HTHP @ °F	Cake 32nds	FILTRATE ANALYSIS Pm	Pf/Mf	Cl ppm	Ca ppm	SAND %	RETORT Solids %	Oil %	Water %	CEC Mud, me/ml	REMARKS AND TREATMENT

MATERIAL	AMOUNT	COST $	MATERIAL	AMOUNT	COST $	MATERIAL	AMOUNT	COST $
AQUAGEL	142	1,620.22	CELLEX	5	569.10	ZEOGEL	355	3,269.55
ALUM.STEARATE	10	514.70	DEXTRID	126	6,431.04			
BAROID	1,583	15,355.10	FIBERTEX	24	356.88	TOTAL MATERIALS		32,957.79
BEN-EX	13	154.18	KWIK-SEAL	64	1,579.44	TECHNICAL SERVICE,		
BICARB.OF SODA	3	77.40	MICATEX	74	950.90	34 days @ $265.00		9,010.00
CALCIUM CHLORIDE (1179 Bags by Husky)			Spersene	30	636.30			
CAUSTIC SODA	15	357.90	WALL-NUT	74	1,067.08			41,967.79
						Drayage		
						Sales Tax		
							TOTAL COST	

BAROID DIVISION

NL INDUSTRIES

MUD MATERIALS
Used (Total)

DRILLING MUD RECORD

FR-1902-5A

PRINTED IN U.S.A.

BIT RECORD

Husky Oil NPR Operations, Inc., NPR4
South Barrow Well No. 14

BIT NO.	BIT SIZE	BIT MFGR.	BIT TYPE	SER. NO. OF BIT	JET SIZE 1	2	3	DEPTH OUT	FTGE.	HRS. RUN	ACC. HRS.	FT. PER. HR.	WEIGHT 1000 LBS	ROTARY R.P.M.	VERT DEV.	PUMP PRESS	PUMPS LINER	SPM.	MUD WT.	VIS	DULL CODE T	B	G
1	13½	HTC	OSC 3AJ	2W-861	15	15	15	1048	1010	51¼	51¼	19.7	All/ 14	125	1/4	750	7¼	45	10.5	32	3	2	I
2	8½	HTC	X3A	X2029	13	13	13	1494	446	9¼	60½	48.2	12/ 15	120	1/4	1000	6¼	45	9.3	38	5	2	I
3	8½	HTC	X3A	X2119	13	13	13	1950	456	8½	69	53.6	15/ 20	120	1/4	1000	6¼	45	9.4	37	5	2	I
RR2	8½	HTC	X3A	X2029	13	13	13	1955	5	1	70	5	15/ 20	120	1/4	1000	6¼	45	9.4	38			
4	6	Smith	DGJ	484FJ	0	0	0	1955	0	2	72		12	60		600	5	50	12	50	1	1	I
RR4	6	Smith	DGJ	484FJ	0	0	0	2100	245	8	80	30.6	12	60		600	5	50	12	50	8	4	I
5	6	Smith	DGJ	108FK	0	0	0	2182	82	8½	88½	9.7	12	80	1 3/4	600	5	50	12	50	8	5	I
6	6	Smith	DGJ	898FJ	0	0	0	2257	75	10	98½	7.5	12/ 14	80	1 3/4	600	5	50	12	60	7	3	I
CrHd	5 32/ 32	ACC	DIA		←	N/A	→	2257	0	0	98½		0	0		0	5	0	0	0			
RR6	6	Smith	DGJ	898FJ	0	0	0																

CASING INTRODUCTION

Casing programmed for South Barrow Well No. 14 was as follows: 20" conductor at ±80'; 10-3/4" at ±1200'; 7" at ±2500'; and a 2-7/8" production string if the well was to be completed. Actual casing run was 20" at 53', 10-3/4" at 1042', 7" at 1947'. A 5-1/2" slotted liner was run from 1822' to 2125', and a 2-7/8" string of production tubing hung at 1754' to complete the well. The 2-7/8" tubing had originally been run to 2079' for testing of the well, then was pulled, a retrievable bridge plug set at 1772', and the 2-7/8" tubing re-hung at 1754'.

PAGE 1 OF 1

CASING TALLY

DATE: January 31, 1977

FIELD East Barrow Gas Field LEASE & WELL NO. So. Barrow Well No. 14 TALLY FOR 10 3/4" CASING

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	Baker Shoe		1	83	
2	Baker Float Collar		1	80	
3	Landing Joint		15	00	
4	Kelly Bushing		1	60	
5					
6					
7					
8					
9					
0					
TOTAL A			20	23	

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR
1			32	04	
2			30	93	
3			31	97	
4			28	76	
5			29	90	
6			29	96	
7			31	83	
8			30	01	
9			31	61	
0			28	67	
TOTAL D			305	68	

1	Cent.		31	21	
2			31	62	
3	Cent.		30	32	
4			29	86	
5	Cent.		31	90	
6			32	24	
7	Cent.		30	42	
8			29	32	
9	Cent.		30	29	
0			31	71	
TOTAL B			308	89	

1	Cent.		32	23	
2			29	87	
3	Cent.		31	57	
4					
5					
6					
7					
8					
9					
0					
TOTAL E			93	67	

1			28	06	
2			31	99	
3			32	03	
4			30	75	
5			31	58	
6			30	15	
7			32	68	
8			31	68	
9			32	16	
0			32	93	
TOTAL C			314	01	

TOTAL A			20	23
TOTAL B			308	89
TOTAL C			314	01
TOTAL D			305	68
TOTAL E			93	67
TOTAL PAGE			1042	48

CASING OR LINER CEMENT JOB

Lease East Barrow Gas Field Well So. Barrow No. 14 Date February 1, 1977

Size Casing 10 3/4" Setting Depth 1042' Top (liner hanger)

Hole Size 13 1/2" Mud Gradient .53 psi/ft (10.2 ppg) Viscosity 33

Casing Equipment

Baker shoe. Baker Duplex float located 36 feet

above shoe. (DV, FO) collars located at feet

and feet

Seven Baker centralizers located middle shoe joint, 3, 5, 7, 9, 31, 33, casing collars.

scratchers located

Liner hanger and pack off (describe)

Miscellaneous (baskets etc.)

Cement (around shoe)

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(1)	760	Halliburton	Permafrost		14.8/15	706 cu ft
(2)						

Cement through (DV, FO) Collar at feet

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(3)						
(4)						

PAGE 1 OF 1

CASING TALLY

DATE: February 6, 1977

FIELD ~~East~~ Barrow Gas Field LEASE & WELL NO. So. Barrow Well No. 14 TALLY FOR 7 " CASING

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR
1	Float Shoe		1	53	
2	XO		1	44	
3	Shoe Joint		41	15	
4	XO		1	50	
5	Float Collar		1	71	
6	XO		2	11	
7					
8					
9					
0					
TOTAL A			49	44	

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR
1	42	08			
2	41	18			
3	38	78			
4	41	48			
5	41	70			
6	41	28			
7	39	96			
8	41	10			
9	41	30			
0	41	65			
TOTAL D	410	51			

1	41	93			
2	40	20			
3	40	71			
4	39	45			
5	39	97			
6	39	60			
7	41	65			
8	34	15			
9	42	20			
0	39	00			
TOTAL B	398	86			

1	41	05	40	18	
2	40	43	39	53	
3	41	05	41	29	
4	39	62	40	58	
5	42	75	41	55	
6	39	38	40	82	
7	41	83	39	55	
8	38	83	(3	00)	
9	41	39	CUT	OFF	
0	40	10			
TOTAL E	406	43	280	50	

1	40	19			
2	34	10			
3	39	50			
4	40	68			
5	41	48			
6	40	85			
7	41	80			
8	40	10			
9	40	30			
0	41	28			
TOTAL C	400	28			

TOTAL A	49	44		
TOTAL B	398	86		
TOTAL C	400	28		
TOTAL D	410	51		
TOTAL E	406	43	280	50
TOTAL PAGE			1947	00

CASING OR LINER CEMENT JOB

Lease East Barrow Gas Field Well So. Barrow Well No. 14 Date February 6, 1977

Size Casing 7", 32# Setting Depth 1947.50' Top (liner hanger) ____

Hole Size 8 1/2" ____" Mud Gradient .53 psi/ft (10.2 ppg) Viscosity 34

Casing Equipment

Baker ____ shoe, Baker Duplex ____ float located 49.44 ____ feet

above shoe, ____ (DV, FO) collars located at ____ feet

and ____ feet

____ centralizers located middle shoe joint, 3, 5, 7, 9, 11, 13, 15, 17, 46, 47, casing collars.

____ scratchers located ____

Liner hanger and pack off (describe) ____

Miscellaneous (baskets, etc.) ____

Cement (around shoe)

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
1	760	Halliburton	Permafrost		14.8/15	706.80 cu ft
2	125	Halliburton	G	2% Calcium Chloride	15.8	143.75 cu ft

Cement through (DV, FO) Collar at ____ feet

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
3						
4						

PAGE 1 OF 1

LINER TALLY

DATE: February 22, 1977

FIELD East Barrow Gas Field LEASE & WELL NO. So. Barrow Well No. 14 TALLY FOR 5 1/2" LINER

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR
1	41	75	Shoe		
2	41	95	Perf		
3	41	37	Perf		
4	42	95	Perf		
5	40	79	Perf		
6	42	04			
7	41	90			
8	0	73	XO		
9	13	89	Hanger & Packer		
0					
TOTAL A	307	37			

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR
1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL D					

1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL B					

1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL E					

1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL C					

TOTAL A					
TOTAL B					
TOTAL C					
TOTAL D					
TOTAL E					
TOTAL PAGE					

PAGE 1 OF 1 TUBING TALLY DATE: February 22, 1977

FIELD EastBarrow Gas Field LEASE & WELL NO. So. Barrow Well No. 14 TALLY FOR 2 7/8 " TUBING

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR
1	31	56			
2	31	75			
3	29	64			
4	31	55			
5	31	28			
6	30	58			
7	31	62			
8	31	16			
9	31	40			
0	30	57			
TOTAL A	311	11			

JOINT NO	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR
1	31	43	30	55	
2	30	64	30	60	
3	30	54	31	58	
4	31	63	31	28	
5	30	44	31	74	
6	31	30	31	48	
7	31	45	31	54	
8	31	40	31	68	
9	31	35	31	70	
0	30	88	30	55	
TOTAL D	311	06	312	70	

1	31	16			
2	31	29			
3	31	45			
4	31	47			
5	29	74			
6	29	91			
7	29	85			
8	31	82			
9	30	62			
0	31	61			
TOTAL B	308	92			

1	30	87	30	90	
2	31	70	31	60	
3	30	88	29	68	
4	31	02	31	50	
5	31	67	30	92	
6	31	57	30	58	
7	31	50	30	65	
8	29	93	04	00	
9	29	84			
0	31	50			
TOTAL E	310	48	219	85	

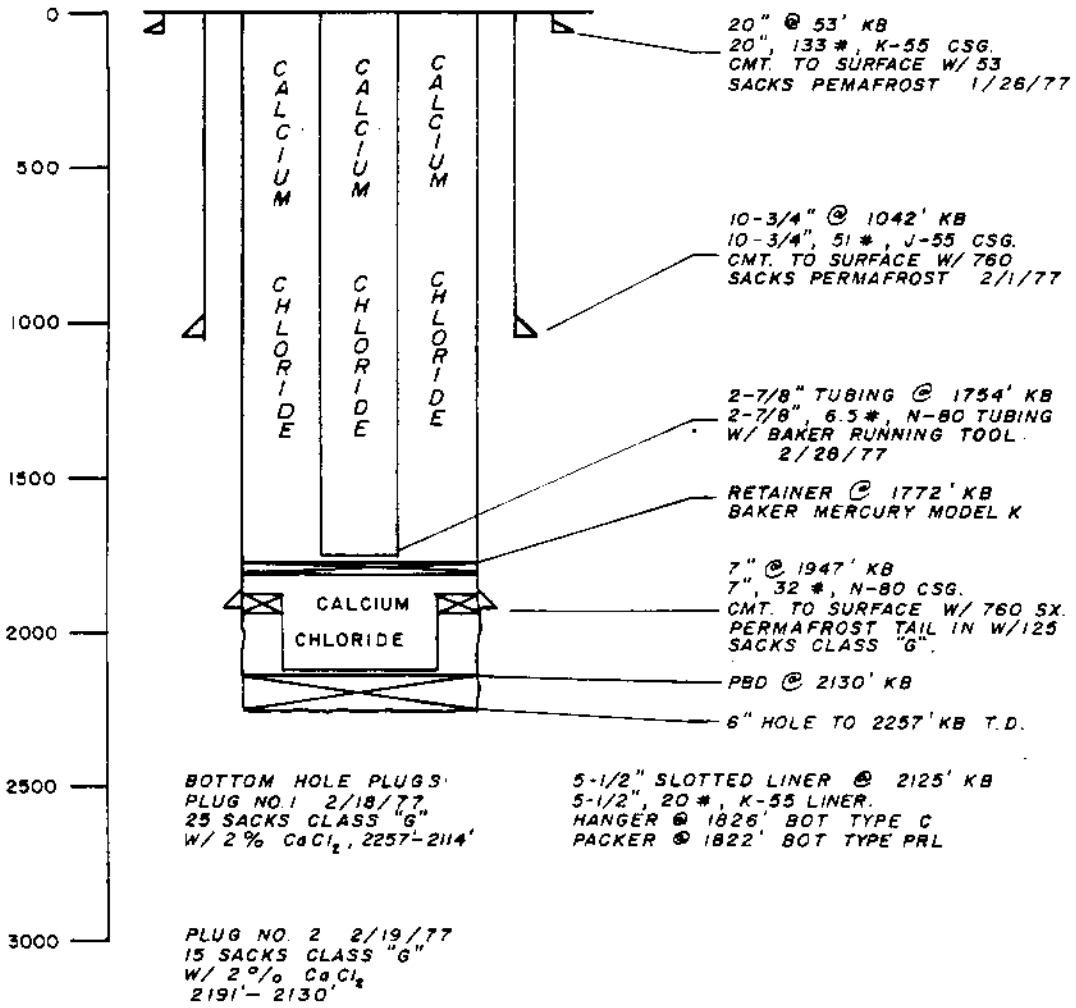
1	30	46			
2	31	84			
3	30	94			
4	31	54			
5	30	64			
6	30	86			
7	30	25			
8	31	70			
9	31	05			
0	31	61			
TOTAL C	310	89			

TOTAL A	311	11	312	70
TOTAL B	308	92	219	85
TOTAL C	310	89		
TOTAL D	311	06		
TOTAL E	310	48		
TOTAL PAGE			2085	01

Landed Below KB: 12 00

Total: 2097 01

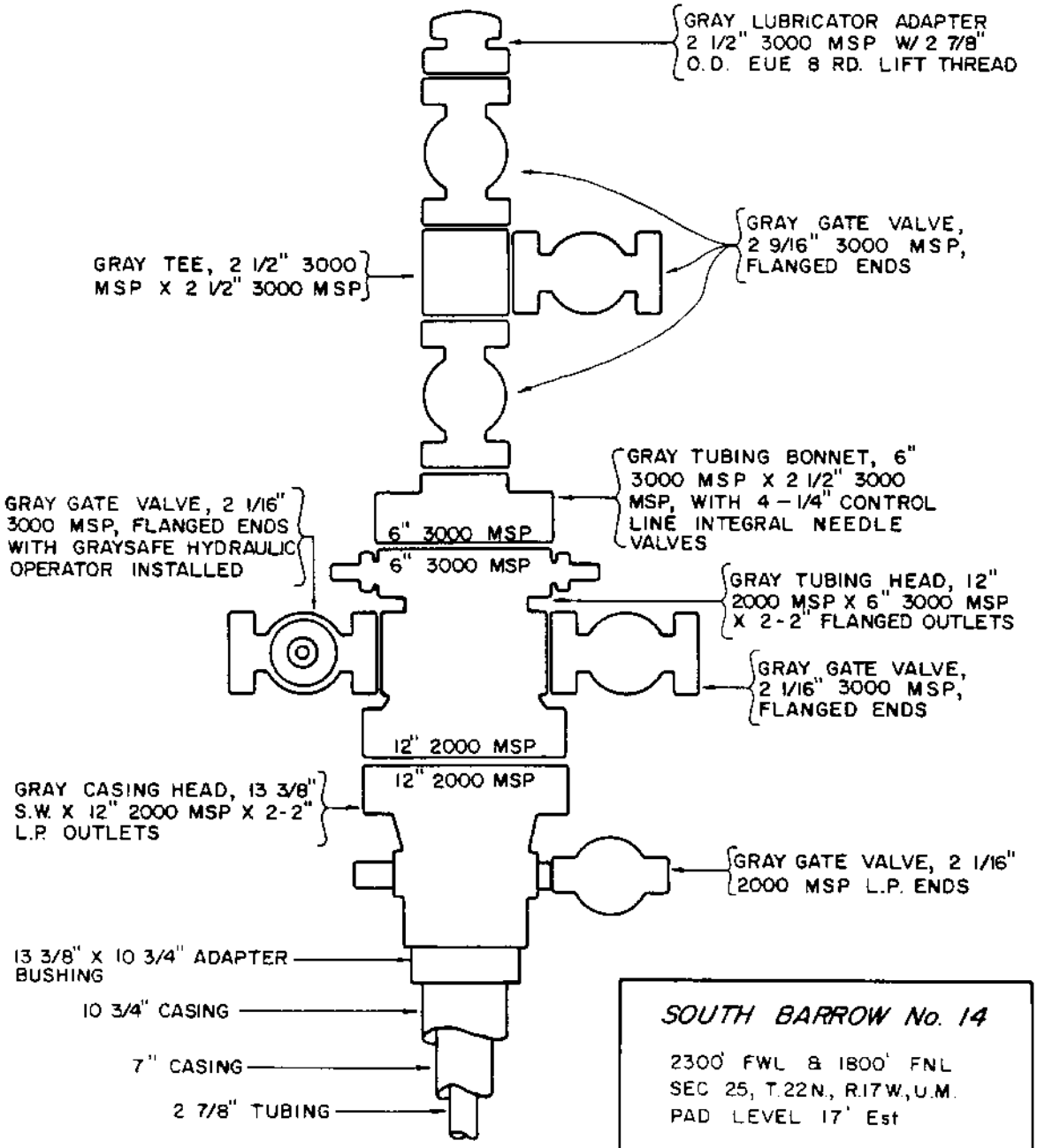
WELLBORE SCHEMATIC



SOUTH BARROW NO. 14
2300' FWL AND 1800' FNL
SECTION 25, T22N, R17W, UM.
PAD LEVEL 17' EST, KB 31' EST.
HUSKY OIL NPR OPER.
NAVAL PETROLEUM RESERVE NO. 4

SURFACE EQUIPMENT

SOUTH BARROW No. 14



SOUTH BARROW No. 14

2300' FWL & 1800' FNL
SEC 25, T.22N., R.17W., U.M.
PAD LEVEL 17' Est

HUSKY OIL N.P.R. Operations Inc.

March 18, 1977

MEMORANDUM TO FILE - SOUTH BARROW WELL NO. 14

SUBJECT: Pressure Buildup Survey and Open Flow Potential Analysis

I. Pressure Buildup Analysis

A. Summary of Results:

1. Initial reservoir pressure is extrapolated to be 963 psia.

2. The kh product has been calculated to be 346.28 md. ft.

3. Assuming a productive thickness of the main producing sand is 22' from the logs, the calculated average permeability to gas is 15.74 md.

4. The average calculated mobility of gas is 1356.90 md./cp.

5. The skin effect calculated 1 hour after shut in is -1.78. The corresponding pressure difference is -23 psi.

6. The effective wellbore radius is calculated to be 1.48 ft.

7. The actual reservoir productivity index is calculated to be 17.32 MCFD/psi.

8. The order of magnitude radius of investigation for the transient pressure buildup is calculated to be 270 ft.

B. Discussion:

The bottomhole pressure buildup survey on the South Barrow Well No. 14 was conducted as a 72 hour shutin commenced after a stable flow period of 10 hours, following and as a part of the Open Flow Potential Test conducted on the well. The pressure data was recorded on Amerada pressure gauges run on wireline and hung in the well opposite the main producing sand. The raw data is presented in Camco report for the subject well and test. Further analysis of the data was necessary to define the pressure buildup response. The data analysis procedure is outlined below.

The data were replotted in the conventional gas analysis manner and are attached as figures 1, 2, and 3. Critical properties of the gas were calculated from the gas compositional analysis of samples from DST No. 1, analyzed by Chemical and Geological Laboratores of Alaska, Inc. Since the production history of the well prior to shut in had consisted of several flow rates, the multiple rate history was incorporated into the analysis. Figure 4 depicts the rate, time history of the well.

C. Results:

1. The initial reservoir pressure of 963 psia was derived from the extrapolation of the curve of figure 3. The value agrees with the final measured values obtained during the final 26 hours of the pressure buildup.

2. From analysis of the slope of the straight line portion of the buildup, the kh product was calculated to be 346.28 md. ft. Average reservoir flowing temperature and pressure were used to calculate the average physical properties of the gas.

3. The calculation of average permeability requires the assumption of a productive thickness and the requirement that the total production come from this thickness. Log analysis indicates the thickness of the main productive sand to be 22 ft. As a result, the calculated average permeability to gas is 15.74 md.

4. The average mobility to gas is calculated to be 1356.90 md./cp. at average reservoir flowing temperature and pressure.

5. The calculated skin effect is -1.78, and the corresponding pressure difference is -23 psi. Since the well had been recently drilled and not subject to stimulation treatment, it is unlikely that a negative skin should be evidenced at this time. However, the determination of the skin is a function of the flow rate and pressure distribution around the wellbore. As such, it is sensitive to the completion scheme employed. Since the well is completed with a slotted liner type completion, other intervals are open to production besides the main sand. This being the case, the assumption that the entire production is attributable to the main sand may be slightly in error. Minor production may be derived from other zones, resulting in an abnormally low skin calculated in the main sand. Qualitative inspection of the buildup curve indicates that some small layering effect, probably in the absence of crossflow, is present with a reservoir pressure nearly the same as the main sand.

6. As a result of the above, and assuming for practical purposes that the entire production is attributable to the main sand, the effective wellbore radius is calculated to be 1.48 ft.

7. The reservoir productivity index is calculated to be 17.32 MCFD/psi.

8. Using the van Poolen equation as an order of magnitude estimate, the radius of investigation for the transient

pressure buildup is calculated to be 270 ft. It must be remembered that this is an estimate only.

II. Open Flow Potential Analysis

A. Summary of Results:

1. The Absolute Open Flow Potential of the Well is 3,700 MCF/D.

2. The exponent (n) of the back-pressure curve is 0.56.

3. The angle of the slope of the back-pressure equation is 60.95°.

B. Discussion:

The Open Flow Potential Test was conducted as a multi-point stabilized back pressure test.

Minor problems were encountered with hydrate formation but were overcome without incident by lubricating alcohol and blowing down as required.

Flow measurements were taken by means of a 2in.critical flow prover. Bottomhole flowing pressures were calculated from flowing surface pressures by means of the Smith Equation, at average values of pressure, temperature and physical properties. Reservoir pressure was determined from the pressure buildup analysis discussed previously.

The data were plotted and analyzed using the conventional multi-point back-pressure analysis and plot and is attached as figure 5.

C. Results:

1. Data used in plotting back-pressure curve.

Q (MCF/D)	Pwf. (psia)
126.17 MCF/D	948 psia
485.57	930
1,091.29	911
1,721.44	834
2,755.36	628
3,285.36	741

The Absolute Open Flow Potential for the well is read from the curve as being 3,700 MCF/D.

2. The exponent (n) of the back-pressure equation, taken as the reciprocal of the slope of the curve, is found to be 0.56. This value is found to fall within the accepted limits of 0.50 and 1.00.

3. The angle of the slope of the back-pressure curve is found to be 60.95°. This value falls within the accepted limits of 45.0° and 63.5°.

III. Conclusions

The testing equipment and procedures were adequate to effectively determine the basic reservoir properties and to determine the Open Flow Potential of the well. Should more rigorous determinations be necessary, the test equipment should be upgraded and testing procedures carefully planned and executed to derive the maximum useful data.

J. M. McCarthy
Drilling Engineer

Attachments

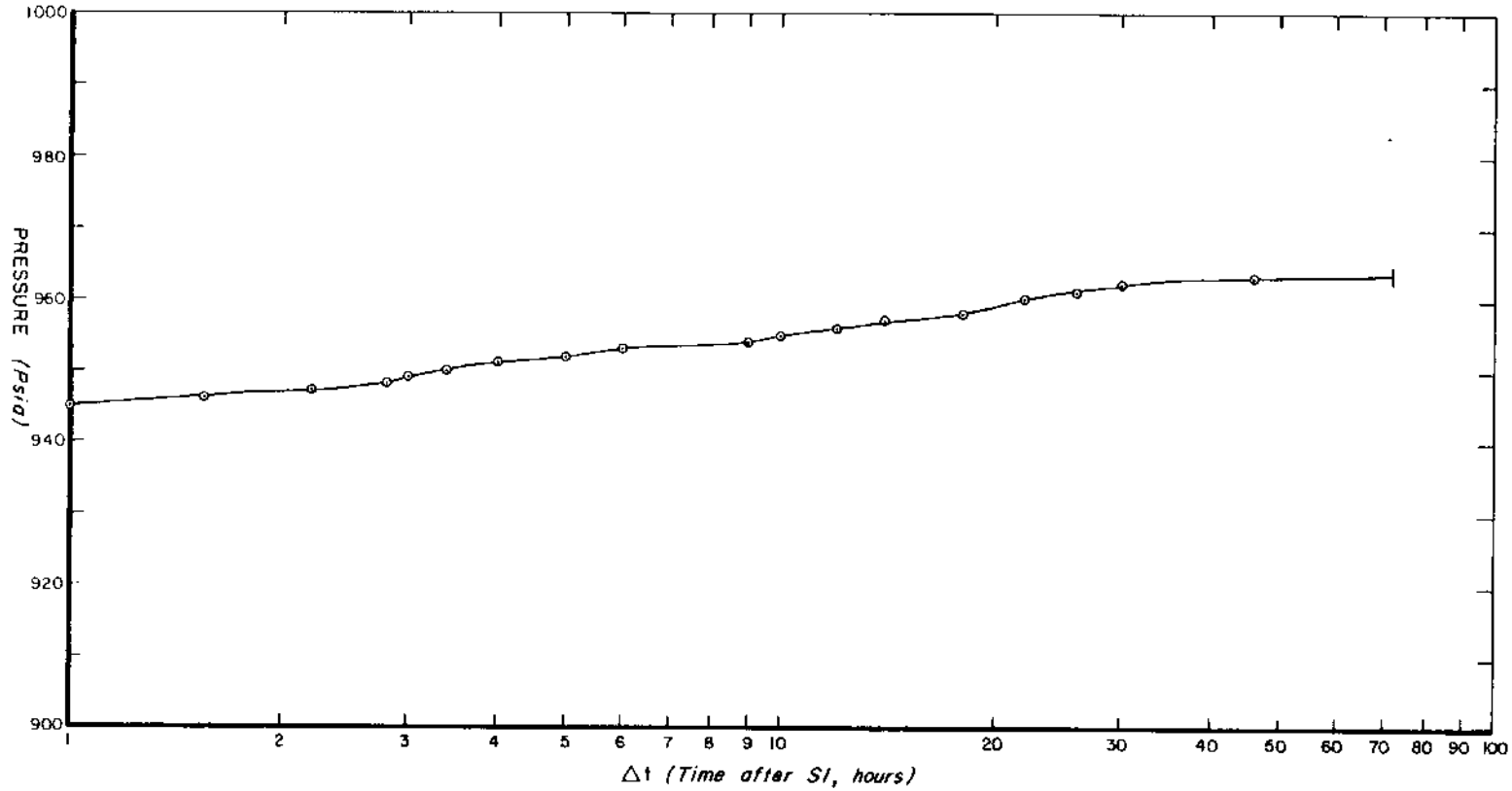


FIGURE 1

SOUTH BARROW No. 14

PRESSURE BUILD-UP

PRESSURE versus TIME AFTER SHUT IN

JMM 3/16/77

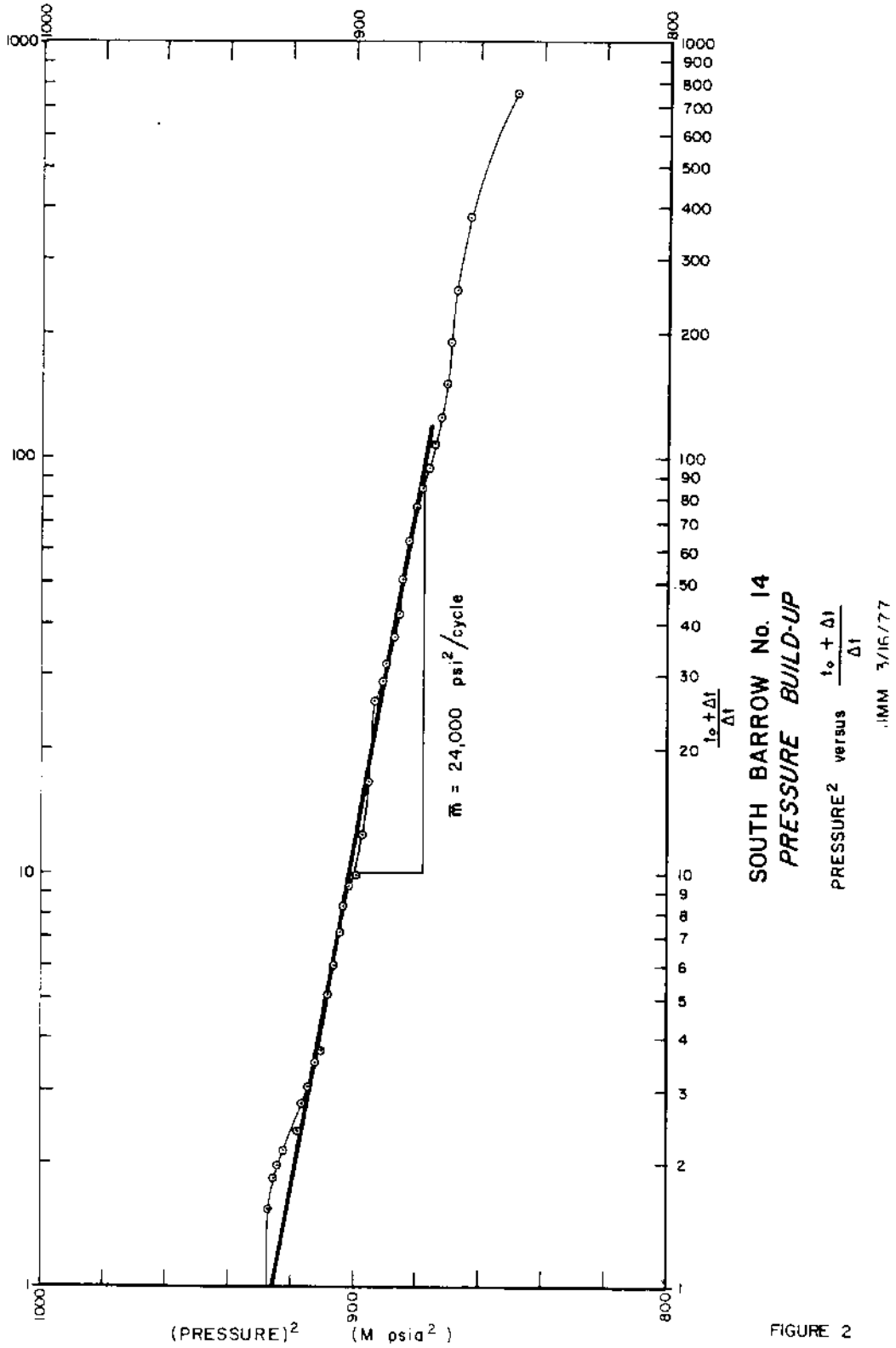
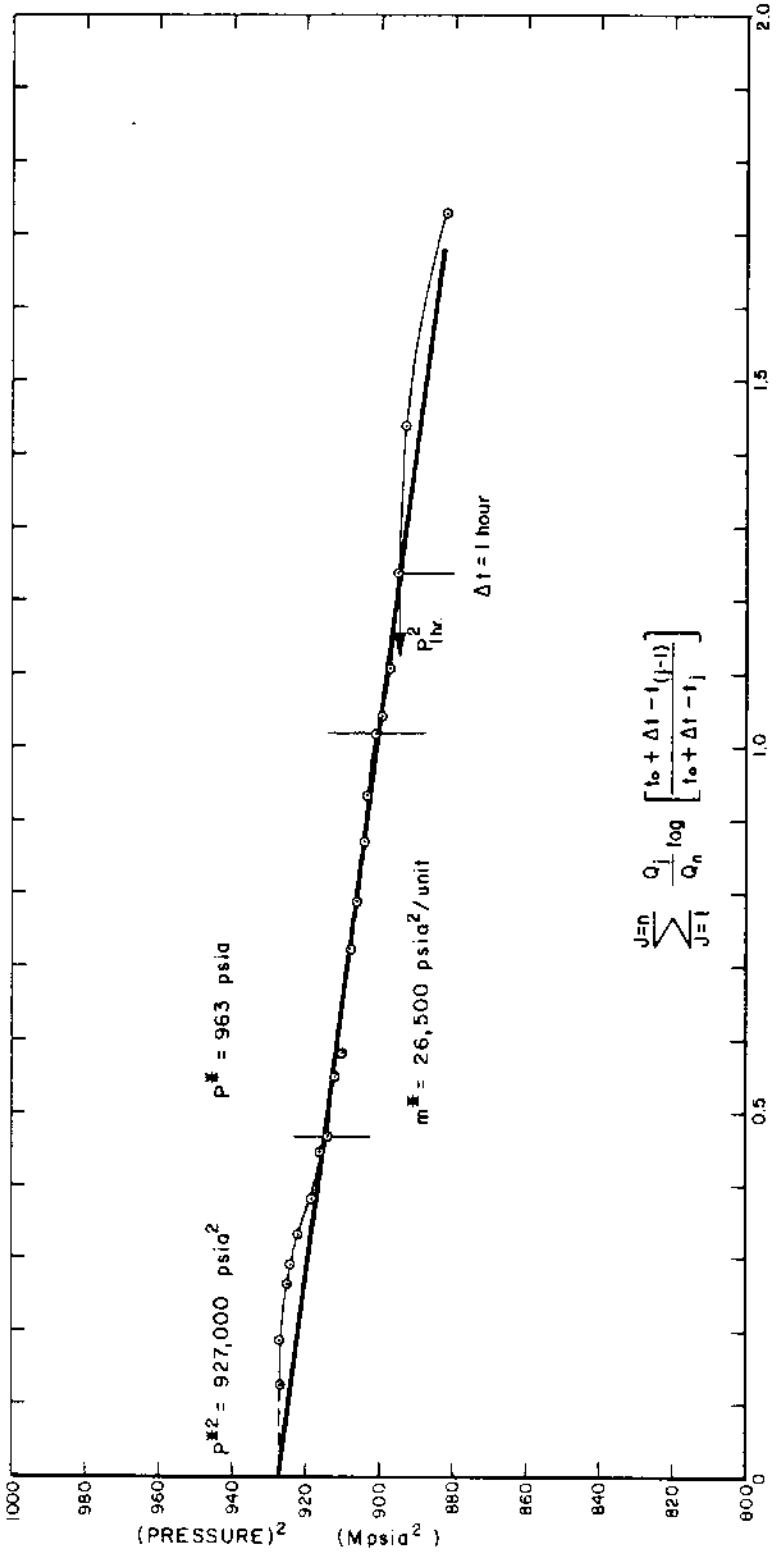

SOUTH BARROW No. 14
PRESSURE BUILD-UP
PRESSURE² versus (tp + Δt)/Δt
JMM 3/16/77
m̄ = 24,000 psi²/cycle
(PRESSURE)² (M psia²)
(tp + Δt)/Δt

FIGURE 2



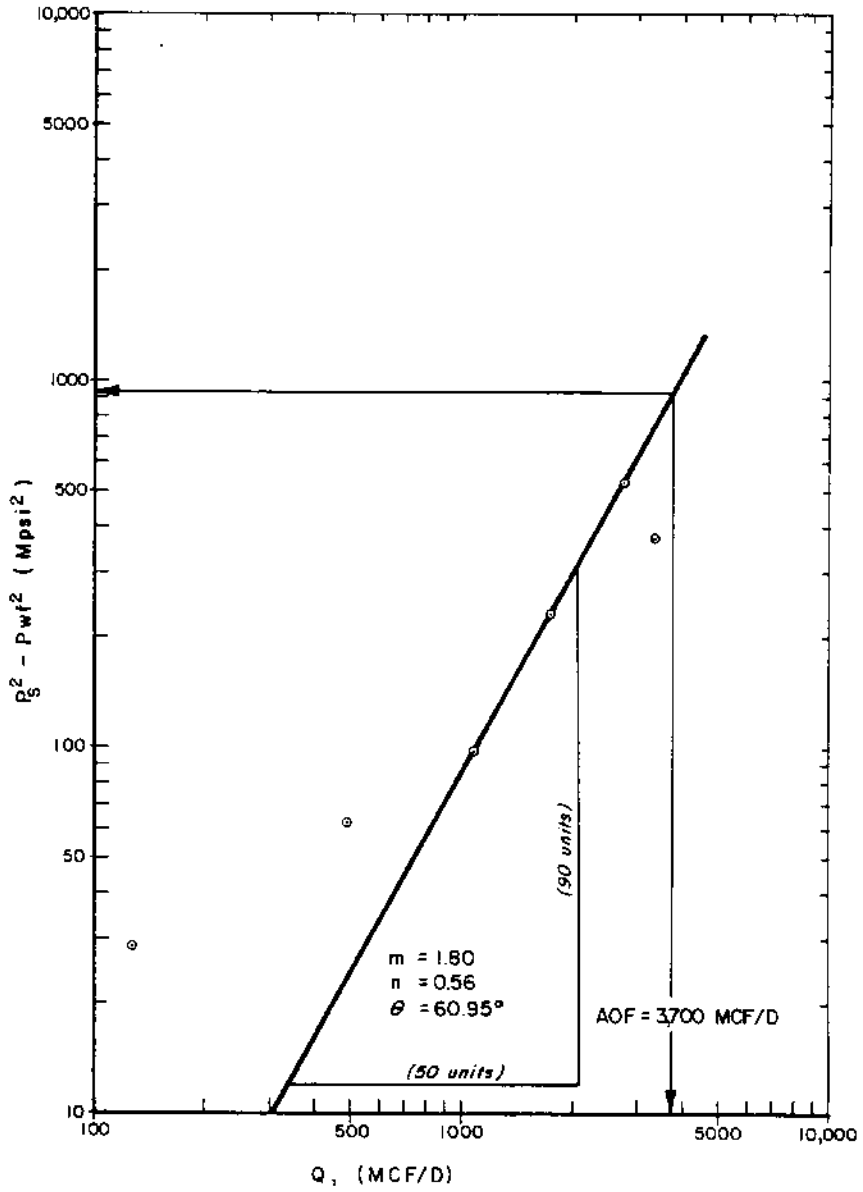
SOUTH BARROW No. 14

PRESSURE BUILD-UP

PRESSURE² versus $\Sigma f(Q_j, t_j, \Delta t)$

JMM 3/16/77

FIGURE 3

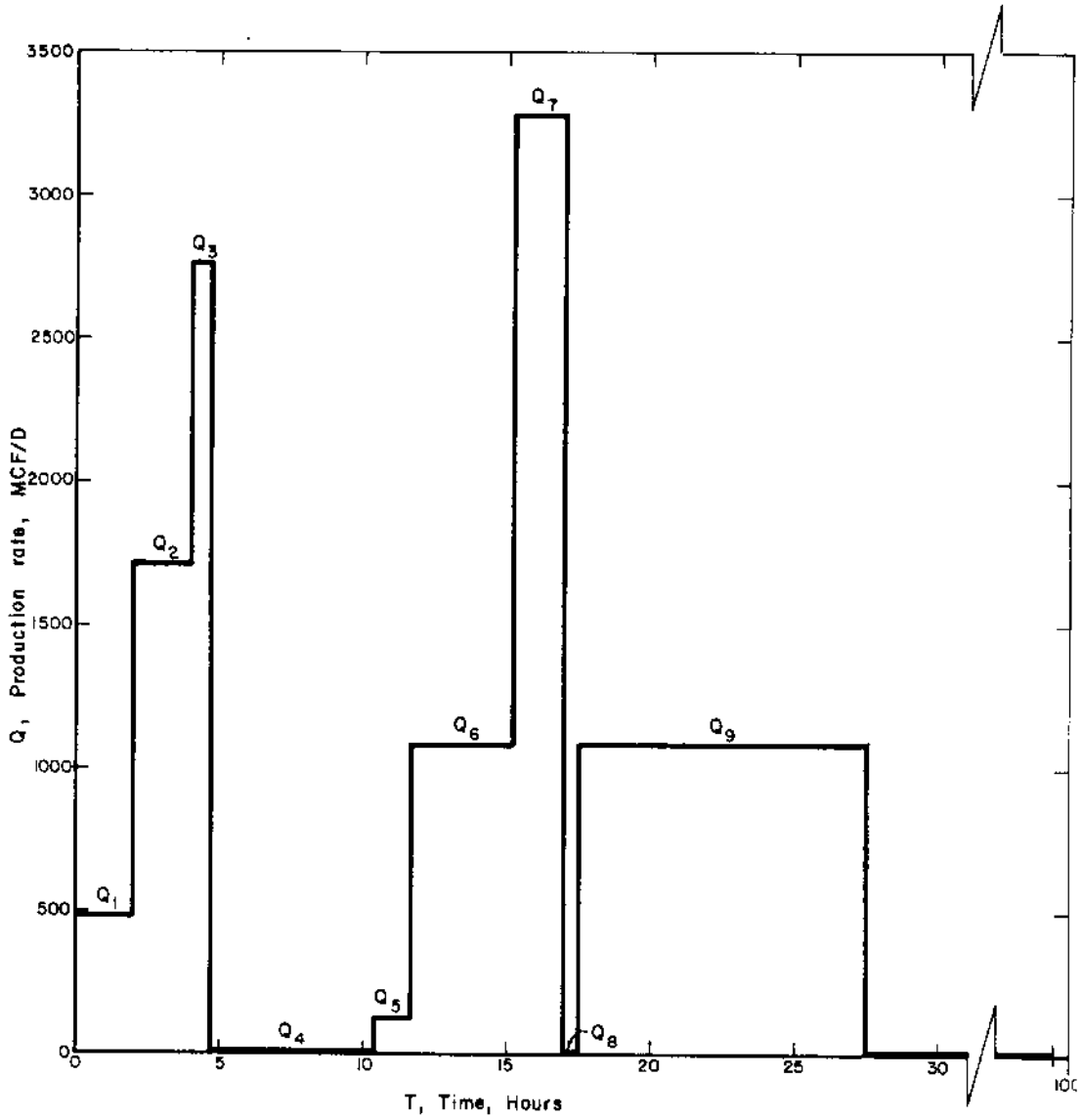


SOUTH BARROW No. 14

MULTI-POINT, OPEN FLOW POTENTIAL TEST

JMM 3/16/77

FIGURE 5



SOUTH BARROW No. 14

RATE versus TIME

JMM 3/16/77

FIGURE 4

CHEMICAL & GEOLOGICAL LABORATORIES OF ALASKA, INC.

TELEPHONE (907) 279-4014 P.O.BOX 4-1276 ANCHORAGE, ALASKA 99509 4649 BUSINESS PARK BLVD.

GAS ANALYSIS REPORT

Company Husky Oil Company Date February 14, 1977 Lab. No. 5434
Well No. South Barrow Number 14 Location
Field Naval Petroleum Reserve, No. 4 Formation
County Depth 1950-2100 feet
State Alaska Sampling point
Line pressure --- psig; Sample pressure 700 psig; Temperature --- ° F; Container number
Remarks

Component	Mole % or Volume %	Gallons per MCF
Oxygen	0	
Nitrogen	1.84	
Carbon dioxide	0.05	
Hydrogen sulfide	---	
Helium	0.03	
Methane	97.11	
Ethane	0.57	0.008
Propane	0.03	0.003
Iso-butane	0.01	0.044
N-butane	0.14	0.033
Iso-pentane	0.09	0.022
N-pentane	0.06	0.029
Hexanes	0.07	Trace
Heptanes & higher	Trace	
Total	100.00	0.139

GPM of pentanes & higher fraction 0.084

Gross btu cu. ft. @60° F. & 14.7 psia (dry basis) 1006
Specific gravity (calculated from analysis) 0.572
Specific gravity (measured) 0.570

Remarks: